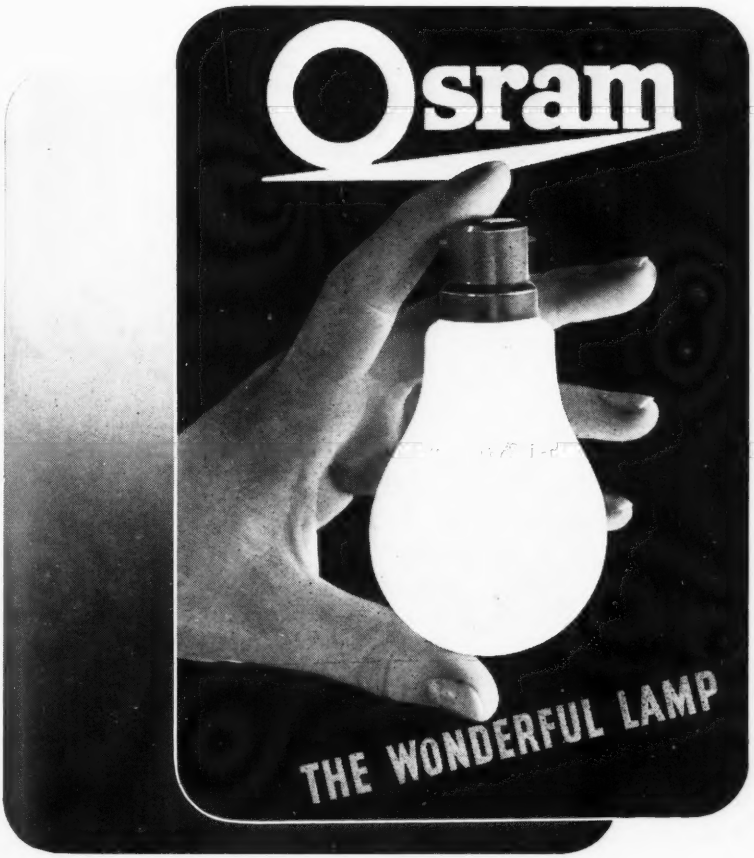
AUG 19 1944
FULL-TIME LIGHTING

ELECTRICAL REVIEW

FOUNDED 1872

Vol. CXXXV. No. 3479 JULY 28, 1944 9d. WEEKLY



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ELECTRICAL REVIEW

July 28, 1944

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EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1
Telegraphic Address : "Ageekay, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (35 lines).
Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter at the New York, U.S.A., Post Office.

Annual Subscription, Post free : British Isles, £2 7s. 8d. ; Canada, £2 3s. 4d. ; Elsewhere, £2 5s. 6d.

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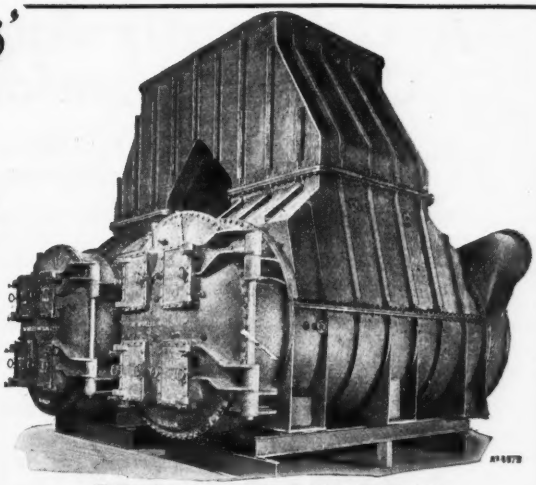

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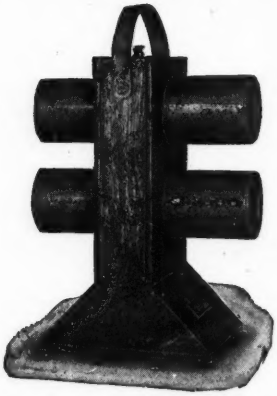

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXXXV. No. 3479. JULY 28, 1944 9d. WEEKLY

Many Inventions

Points for the Patents Committee

LEGISLATION is likely to be introduced in the fairly near future with a view to clearing up anomalies in the patent position and to bringing the law more nearly into line with modern needs. Anomalies do exist, but what might seem to the uninformed to be the most obvious ways of getting rid of them would not necessarily be to the greatest general advantage. All proposals for improvements should therefore be closely scrutinised by technical societies in the light of their special experience lest changes bring more evils than they cure.

Monopoly Rights

One question to the fore is whether the monopoly rights now granted to an inventor for a term of years should be taken from him, leaving it open for anyone to exploit the patent under licence. The opinion of a correspondent in this issue, who writes with the authority of a past-president of the Chartered Institute of Patent Agents, is against the removal of the incentive to industrial development provided by this means. In this he is in close accord with last year's president of the same Institute, Mr. E. W. Moss, who is also chairman of the I.E.E. Measurements Section. In his inaugural address to the latter, Mr. Moss produced evidence in support of his view that " it would be nothing short of disastrous if monopolies for inventions were abolished." Another matter that needs ventilation is whether the high value legally attached to a mere trace of novelty is justifiable, particularly since it is limited to written matter (including prior publication, even by the inventor himself). Experience, however, appears to be in favour of retention of the principle on good grounds.

Then there is the matter of the surrender of patent rights by an inventor to his employers. That the custom has its objectionable features is clear, as our contributor shows. On the other hand, patentable devices produced by staff members are usually small improvements of primary inventions. They are likely to owe much to the resources of the employing concern and to the collaboration of colleagues and their predecessors. The inventor may have been lucky in having a task assigned to him that has enabled him to fill in a gap in a line of investigation, a large part of the credit for which is due to others. He may also perhaps be tempted, if the reward seems immediate, of following up a side issue to the prejudice of his main duties. There is also the risk that the pooling of information, which is the keynote of successful staff working, would become less ready if the attention of individuals tended to thoughts of the remunerative possibilities of patents.

Suppression and Delay

Perhaps the aspect that will give most cause for thought to the Departmental Committee now sitting is that relating to the power possessed by concerns to suppress or delay the development of patents—a possibility more often talked about than found in practice. Patents are granted in order that the public may benefit by inventions as soon as may be

practicable. It may be found that the present safeguards against abuse (which are more far-reaching than appear to be generally supposed) are not enough and that further regulation in certain respects is necessary. Any reforms introduced, however, should be based upon a thorough knowledge of how the present system works and also upon an expert estimation of their international bearings.

I.E.E. Council

FEW men have achieved distinction in electrical science and in commerce to the same degree as has Sir Harry Railing, who will become President of the Institution of Electrical Engineers next October. As this year's chairman of the B.E.A.M.A., as well as chairman and joint managing director of the G.E.C., Sir Harry furnishes an example of the busy man who is proverbially most likely to get things done, and presidency of the Institution is likely to be less of a sinecure than ever it was in the event of an early termination of the war in Europe. A new Vice-President, Mr. W. J. H. Wood, with Mr. W. N. C. Clinch and Mr. F. C. Winfield, ordinary members of Council, are recognised authorities on large-scale electricity in all its aspects. Mr. E. S. Byng, the hon. treasurer, has made administration questions, against a background of communications, his special interest. In the election of Mr. H. Bishop may be found not only a personal tribute but also appreciation of the technical excellence of the B.B.C. Associate members will be appropriately represented by Dr. R. W. Sillars, who is concerned with the immediately topical and always important subject of research.

The Sections

WHILE the chairman and vice-chairman of the four I.E.E. Sections for next session have been elected on grounds of personal qualities, there are especial advantages in present circumstances in the high proportion of them who happen to be technical officers of public or semi-public bodies. An intimate knowledge of affairs in the electrical world aids them, on the one hand, in leavening the policy of lay administrators and, on the other, should ensure that any regulations they may be responsible for drawing up give due weight to opinions expressed by engineers generally. At the same time the latter will carry them out all the more effectively when they can be brought to appreciate that official requirements are reasonable.

Good Lighting

To quote the words of the draft Code of Practice referred to elsewhere in this issue, artificial lighting should be considered as much an integral part of the design of the building as the windows provided for natural lighting. Installation work should be carried out at the time of construction and this implies the need for co-operation between the lighting engineer and the architect in the earliest stages. Provision should also be made for the tendency of standards of illumination to rise, especially with improvements in efficiency of lighting sources. The lighting engineer should, it is stated, know not only the positions proposed for the fixtures but also the normal disposition of furniture. This should apply to electrical installation work generally, of which lighting forms only a part.

Post-War Installations

A COPY has been received of the Ministry of Works Post-War Building Publication No. 12 dealing with mechanical installations, but so far we have not seen No. 11—electrical installations. Mr. W. Riggs, president of the Electrical Contractors' Association, which was represented on the committee responsible for the report, referred at last week's E.C.A. meeting to the delay in publication which he described as "unfortunate." He pointed out that local authorities all over the country were making their own arrangements for installation work apparently without regard to the unknown contents of the report. We are aware that there is some difference of opinion upon certain points of practice, but this must not be allowed to cause indefinite delay.

Basic Regulations

A DIFFERENCE of opinion exists between the E.C.A. and the Institution of Electrical Engineers upon the question of the basic regulations recommended by a sub-committee of the Institution. Mr. Riggs said he had failed to find "any evidence as to its justification or the expressed wish of any section of the electrical industry to have such basic regulations." In this matter and in the

question of compulsory registration of contractors and operatives (which the E.C.A. supports) Mr. Riggs accused the I.E.E. of seeking to impose "doctrines or dogmas" upon the industry and "hampering progress which the industry demanded for the safety of the public." These were rather harsh words with which to describe what was, after all, quite a reasonably-worded report.

Preserving Amenities

As had been generally expected, the Government has decided that a public inquiry shall be held into the North Eastern Electric Supply Co.'s proposal to erect a power station on the outskirts of Durham—a proposal which opponents say threatens to mar the natural and architectural scene on that section of the River Wear. The Durham dispute seems to have aroused a similar storm at Lincoln where extensions of the St. Swithin's power station are contemplated. Here it is a pair of cooling towers which appear to form the main object of dislike even though Mr. F. Newey, the city electrical engineer, says that they will carry "a certain amount of architectural ornamentation which will provide relief from the regular lines."

Ill Assorted

It is evident that there is a feeling abroad that in this respect, too, crabbed age and youth cannot live together—that historic buildings and power stations consort but ill. It is doubtful whether the best of modern architecture or "ornamentation" can overcome these objections and this makes the possibility of compromise remote. But further comment must be suspended until the holding of the inquiry (or maybe inquiries).

What are Engineers?

CONSIDERING how much this country has owed to its engineers and must continue to owe to them in maintaining its pre-eminence, the results of ignorance as to their proper status go far beyond any question of professional pride. Inability to distinguish between one who applies the resources of nature to human needs and anybody who has to do with engines or handiwork generally is not confined to the man in the street. Letters to the editor of the *Daily Telegraph* emphasise that the status and remuneration offered by Government and other bodies are not enough to attract the best brains to essential work. Yet a glance at the educational and technical qualifications required of any engineer entitled to the prefix "chartered," indicating corporate membership of one of the three senior Institutions, ought to be enough to correct an all too common misapprehension.

Government Surplus

REMEMBERING what happened after the last war, many manufacturers and traders are dreading the possible effects of the release of vast quantities of articles of all kinds no longer required by Government Departments. The immediate public reaction to any suggestion of control of disposable surpluses is: "We have paid for it, why can't we have it?" The answer is that they must choose between a flood of goods at bargain prices and their jobs. If, however, the business is properly handled they can still have surplus goods at reasonable prices and still be sure that their particular trade or industry will not be dislocated. This is the Government's intention as expressed in the White Paper from the Board of Trade which is reviewed in this issue.

Orderly Disposal

WHAT has to be aimed at in the disposal of surplus stores is a correlation of this material with new production and so promote an orderly flow regulated as to speed and price. The only way of ensuring this is to set up a co-operative arrangement between the Disposal Departments which are being formed and the representative trade associations, and this is the method which the Government proposes to pursue. Where articles are to be reconditioned or made suitable for civilian service this is pre-eminently the best way of handling them. In any event the public will be better served by having expert guidance in the acquisition of technical equipment instead of being left to buy it because it is cheap, regardless of its suitability.

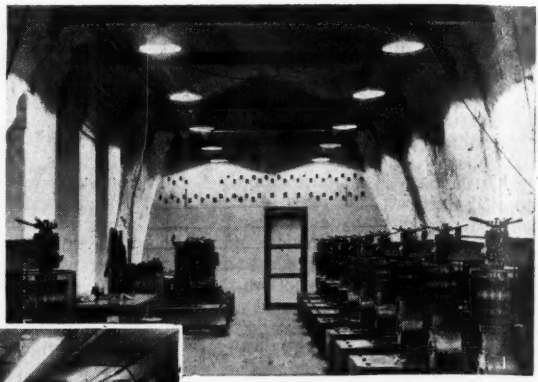
Sidelight

AIRCRAFT equipment is to be the subject of separate attention and what a subject it will be! It will amaze most readers to be reminded that after the last war the Aircraft Disposal Corporation dealt with 10,000 aeroplanes and 30,000 engines. After this war . . .

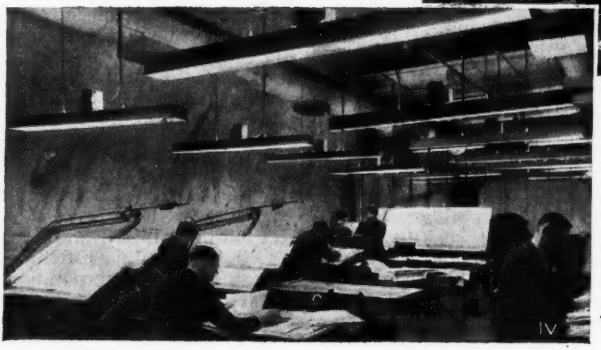
Full-Time Lighting

Underground Factory Installation

THE illustrations accompanying these notes are reasonable photographic representations of the lighting in different sections of an underground factory devoted to the manufacture of aero-engine components, and, of course, the main interest of the installation lies in the fact that at all times the factory is absolutely dependent on artificial lighting. The lighting intensities in the various sections of the factory differ very considerably, according to the classes of work carried out in the sections, and in order to facilitate our presentation of the scheme as a whole we have arranged the illustrations in three groups, representing high-, medium- and low-intensity lighting.



All the illustrations on this page depict sections of the factory with high-intensity lighting



Illustrations Nos. I to IV depict sections with high-intensity lighting. In the spring test section, shown in illustration No. I, 15 ft.-candles at the 4-ft. working plane is required to permit the satisfactory setting up of the machines and the inspection of the springs. The section has a floor area of about 90 ft. by 19 ft. and is about 16 ft. high, and the lighting is provided by means of two lines of seven 16-in. diameter 200-W dispersive reflectors. The lines are about

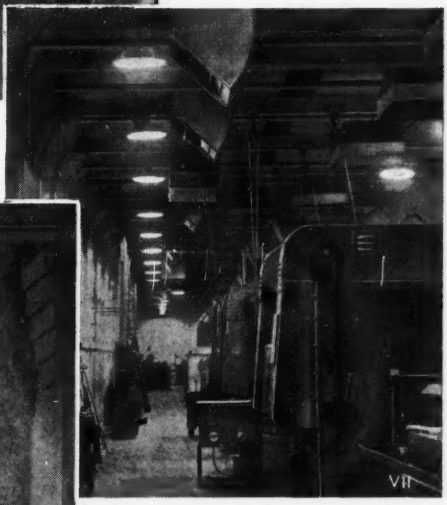
V

VI

8 ft. apart, the spacing in the lines is about 10 ft. 6 in. and the fittings are mounted about 11 ft. from the floor level.

Photograph No. II shows the toolroom which has a floor area of about 60 ft. by 19 ft. and is about 16 ft. high. A high

Two examples of medium-intensity lighting are shown above and two of low-intensity below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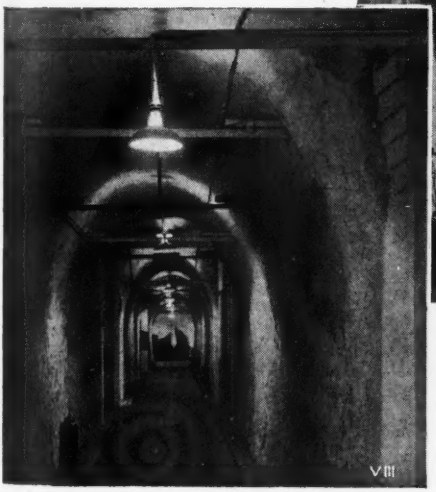

VIII

general-lighting intensity of 15 f.c. is provided by means of three end-to-end lines of 80-W fluorescent trough-type fittings, each outer line comprising four and the centre one three. The mounting height of all the fittings is 11 ft.; they are 5 ft. 5 in. long and are spaced in each line at 13 ft.; distance between lines is 4 ft. 6 in. At each machine-tool the

general illumination is supplemented by local lighting from a 50-W low-voltage adjustable machine fitting, and in this way precision work is carried out in "spot" lighting intensities as high as 30 to 50 f.c.

Even higher local-lighting intensities of from 75 to 100 f.c. for extra fine inspection work are obtained at the benches in the final-view bay depicted in photograph III by means of 75-W "Anglepoise" and M.E.M. bench-lighting fittings. The general lighting in this bay has an intensity of 15 f.c. at the 3 ft. 6 in. working plane; it is afforded by means of two staggered end-to-end lines of fittings with a spacing of 12 ft. 6 in. between the lines. There are seven fittings in each line and the mounting height is about 11 ft. The bay measures 116 ft. by 19 ft. at the floor and is 16 ft. high.

The drawing office depicted in illustration No. IV is an outstanding example of high-intensity general lighting, particularly as the standard 80-W fluorescent fitting is employed. But, of course, the concentration is greater for "covering" a floor area of 40 ft. by 19 ft.; there are two lines of fittings disposed side-to-side, with six in one line and five in the other. The spacing between lines is 8 ft. and between fittings 6 ft. The mounting height is very low for general lighting, too, namely, 7 ft. The overall result is 25 f.c. at the average drawing-board level.

Medium-Intensity Lighting

The first two pictures on the second page are of sections with medium-intensity lighting. Photograph No. V shows a typical machine bay measuring 136 ft. by 19 ft. by 16 ft. high, which is served by two end-to-end lines of 80-W fluorescent reflectors—ten in one line and nine in the other. Mounted at 11 ft., the fittings are spaced at 13 ft., with a 4 ft. 6 in. spacing between rows. The two lines are out of centre in relation to the room, so as to afford unobstructed lighting at both the backs and fronts of the machine tools. This lay-out affords an illumination intensity of about 11 to 13 f.c. at a 3-ft. working plane.

The other medium-intensity illustration, No. VI, relates to a machine-tool section in a main 16-ft. high corridor. The working area here is about 600 ft. by 16 ft. and it is served by two lines of 80-W fluorescent reflectors—forty in one line and forty-one in the other. The unit spacing is 13 ft. and between the lines 5 ft. Here again for a similar reason the lines are out of centre in relation to the bay, and the mounting height of the fittings is 12 ft. The resulting average lighting intensity of 11 to 13 f.c. at the working plane is supplemented by English Electric, G.E.C., and M.E.M. low-voltage local lighting units at the machines.

The two illustrations at the bottom of the second page portray sections of the factory with low-intensity illumination. Photograph No. VII shows a heat-treatment bay with two lines of 16-in. diameter 200-W dispersive reflectors—nine in one line and eleven in the other—with in-line and between-line spacings of 9 ft. 6 in. and 11 ft., respectively. The mounting height is 12 ft. 6 in. and 7 f.c. is afforded at a 3-ft. working plane. The floor area is 116 ft. by 18 ft.

The last picture, No. VIII, is of a small corridor serving the general offices where only 3 to 5 f.c. is necessary. This is obtained by a central line of eleven 9-in. diameter "Coolicon" shades with 40-W lamps mounted at 7 ft. 6 in.

Course for Teachers

Experiment at Loughborough

IN response to an invitation sent out by Mr. D. B. Hoseason, of the Brush Electrical Co., Ltd., a number of well-known concerns have nominated teachers from their works' schools to take part in an experimental and intensive course in the principles and technique of teaching. The aim of the course is to give training of the type described as "Unit B" in the proposals for the training of the technical teacher made in the McNair Report, but as it is impossible in present circumstances to release such teachers for from four to six weeks, the time suggested by the McNair Committee, plans have been made for the students to be in residence at Loughborough College for two long week-ends separated by a period of nine weeks during which prescribed reading will be carried out. The first of these week-ends has just been completed and the enthusiasm and response of the students is most encouraging and augurs well for the success of the scheme.

The course is under the direction of Mr. J. W. Bridgeman, head of the department for the training of teachers at Loughborough College, and he has the assistance of Dr. M. M. Lewis, vice-principal of Goldsmith's College, Mr. A. H. Stewart of University College, Nottingham, and Mr. F. R. Dain, Loughborough College. The number of students has been limited to twenty-seven so that tutors and students can be in residence together in one of the smaller halls of Loughborough College. In addition to the Brush Electrical Co., the following are taking part in the scheme: Fielding & Platt, Ltd.; Metropolitan-Vickers Electrical Co., Ltd., English Electric Co., Ltd., Stanton Iron Works Co., Ltd., W. T. Henley's Telegraph Works Co., Ltd., S. Smith & Sons, the L.M.S. Railway Co., and Ericsson Telephones, Ltd.

Zinc Alloy Die Casting

THE Zinc Alloy Die Casters' Association, Lincoln House, Turl Street, Oxford, has just issued its first publication entitled "How Zinc Alloy Die Casting Serves Industry." Besides describing the process, it gives details of the Association, including a list of members. Other booklets are to follow on "Plastics and Die Castings Compared," "Plastics and Hot Stampings Compared," "The Designing of Die Castings," "The Plating of Die Castings," etc.

Earth-Leakage Protection

Application to Fused Switchgear

By K. Dannenberg, Dipl.Eng., *and* R. T. Lythall, M.I.E.E.

IN his chairman's address* to the I.E.E. Installations Section last October Mr. A. G. Ramsey drew attention to the problem of persistent earth leakage. He pointed out that when a circuit was protected solely by an overload device a fault could be cleared only after the earth-leakage current

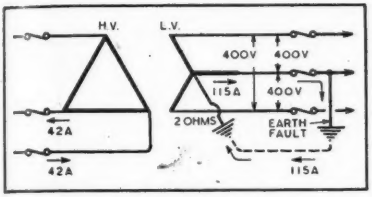


Fig. 1.—Circuit diagram of assumed fault conditions

exceeded the setting of the relays or had developed into a short-circuit. Whereas on lighting sub-circuits breakdowns to earth would often be dealt with by low-set protection, on power and main supply circuits they might require 50 to 100 A to bring about operation and within that range leakages could persist without anyone's knowledge. In a conduit system, a breakdown of one phase would result in current flowing through the conduit and thence through the earth - continuity conductor to a water main or earth electrode. The hot spots created might occur at a bad point in the conduit or, with lead - covered cable, at a chance contact between sheathing and pipework.

Another path for leakage current mentioned by Mr. Ramsey was the sheathing of the supply service where bonded to the installation earth-continuity conductor and any chance contact with pipe-work on the premises. To quote his words, "A problem worthy of investigation is how to devise simple means for determining earth leakage or, better still, simple protection against it."

In his I.E.E. paper "Transmission and Distribution of Electricity to Mines,"† Mr. B. L. Metcalf referred to the amendment to the General Regulations Governing the Use of Electricity in Mines, which advocated that where the voltage exceeded 125 earth-leakage protection should be provided to open the circuit if the current to earth exceeded 15 per cent. of the rated current or 5 A, whichever was the greater. "Earth-leakage protection," he said, "has so far

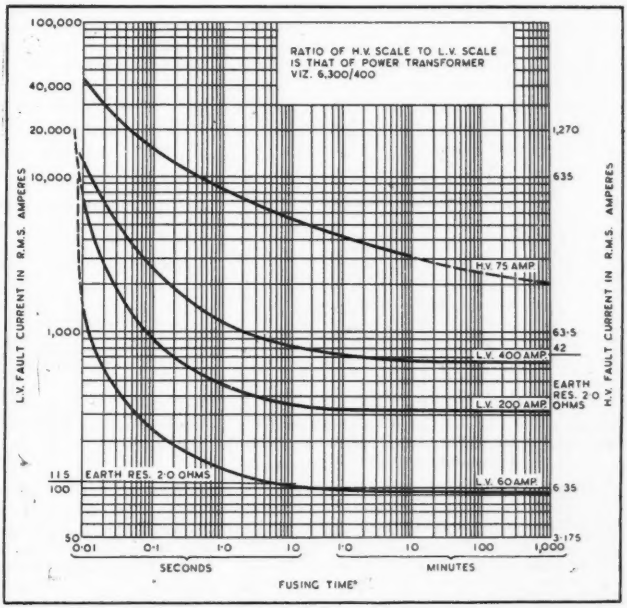


Fig. 2.—Typical characteristic curves for cartridge fuses of different ratings

I.E.E. Journal, Pt. 1, February, 1944.

† *Electrical Review*, February 11th.

not been generally adapted to switch-and-fuse gear and the use of this apparatus is not, therefore, permitted."

The purpose of the present article is to describe a development which is at once simple and effective as required by Mr. Ramsey and which at the same time provides air-break switch-and-fuse gear to satisfy Mr. Metcalf's case.

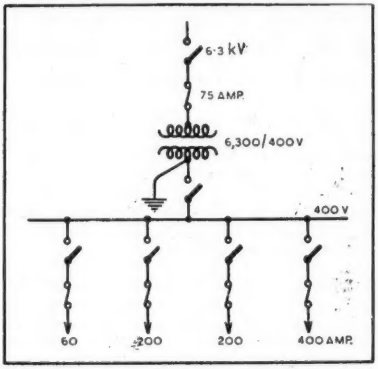


Fig. 3.—Diagrammatic lay-out of substation with fuse protection on both sides of transformer

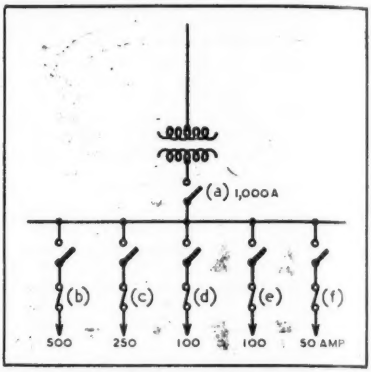


Fig. 4.—Fuse ratings in substation for several parallel feeders

One of the major disadvantages of fused switchgear, *i.e.*, switch-fuses, fuse-switches or air break circuit-breakers backed up by fuses, is that the main circuit fuses, which are provided chiefly for short-circuit protection, will not in general operate when the short-circuit is between one line and earth. This is particularly true on lower voltage systems (say, 400 V) and the reasons are not far to seek. They start with the problem of earthing. For the purpose of illustration 2 ohms will be assumed for good conditions (Fig. 1) —anything less can be regarded as excellent.

We have here a simple case where Ohm's law may be applied to an AC circuit (noting that the value of 2 ohms resistance swamps the zero-phase-sequence impedance) and across the resistance there is impressed the voltage $400/\sqrt{3}$, *i.e.*, 231 V. Therefore the value of current available to operate the fuse in the faulty phase is $231/2=115{\cdot}5$ A. In Fig. 2 are shown the characteristic curves of one make of cartridge fuse for ratings of 60, 200 and 400 A. A line drawn at 115·5 A cuts the curve for the 60-A fuse at a fusing time of 6·5 sec. but does not cut the curves for the 200- or 400-A fuses. From this it is clear that, if an earth fault develops on a circuit with fuses above 60-A rating, it must continue as an earth fault until disconnected either by manual operation of the switch or until the fault develops into a line-to-line fault. Careless earthing or unsuitable conditions may result in much higher values and at 5 ohms the current will be $231/5 = 46$ A, and now even the 60-A fuse will not clear.

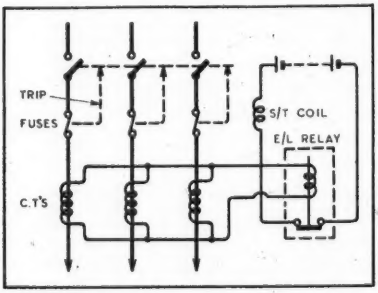


Fig. 5.—Connection of earth fault relay in association with fuses

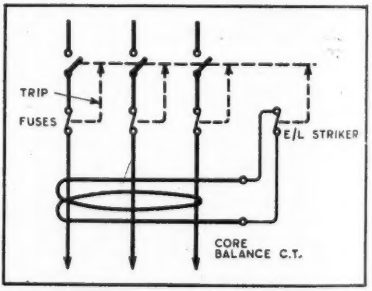


Fig. 6.—Sensitive earth-leakage protection system incorporating striker

For earth-leakage protection, considerably smaller values of earth current should be

detected; *e.g.*, a 5-A lower limit is indicated in mines work. In a recent article,* one of the present authors outlined certain recent developments in fused switchgear and their application to high- and medium-voltage

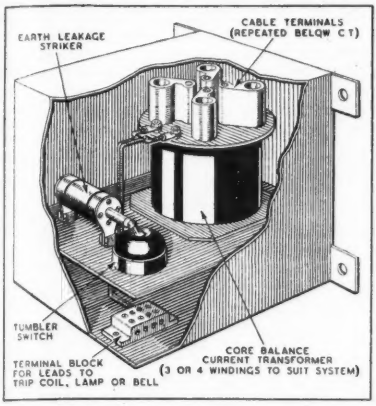

EARTH LEAKAGE STRIKER
CABLE TERMINALS (REPEATED BELOW CT)
TUMBLER SWITCH
TERMINAL BLOCK FOR LEADS TO TRIP COIL, LAMP OR BELL
CORE BALANCE CURRENT TRANSFORMER (3 OR 4 WINDINGS TO SUIT SYSTEM)

Fig. 7.—General view of new tripping device

systems. In a typical recent case the lay-out of the substation was generally as shown in Fig. 3, fuses being used for both high- and lower-voltage protection (see also curves in Fig. 2).

In order to ascertain whether an earth fault on the lower-voltage side, insufficient to blow the 200- or 400-A fuses, would cause the high-voltage fuse to operate, the fault current on the high-voltage side (Fig. 1) has to be considered. As the fault current is 42 A in two lines it cannot operate a 75-A fuse. An alternative method sometimes suggested, and quoted by Mr. Metcalf, is to put earth-fault protection on incoming switches. Providing the load currents of incoming and outgoing circuits are not widely different, this will give a degree of protection, but an earth fault on any outgoing feeder will trip out the incoming supply. If there is a considerable difference between incoming and outgoing circuits, as must nearly always be the case, then a 7·5 per cent. setting on an incoming switch means a considerably increased setting on outgoing circuits. In the case given by Mr. Metcalf, with circuits as in Fig. 4 and a 7·5 per cent. setting on an earth-leakage relay at (a), the percentages of protection afforded to other circuits is (b) 15, (c) 30, (d) 75, (e) 75 and (f) 150, which is useless.

In the earlier article it was shown how incorporation of means of tripping permitted the addition of other forms of protective gear as well as fuses to fused switchgear.

* *Electrical Review*, April 7th.

Such an arrangement could, therefore, employ not only three line fuses but also an earth-fault relay connected in the star point of three current transformers in the conventional manner. The relay is connected to complete a circuit to a shunt trip coil energised from a battery (Fig. 5). This scheme, sound as it is, is relatively costly when applied to simple industrial gear. It involves not only the sensitive relay but also the trip coil and the battery.

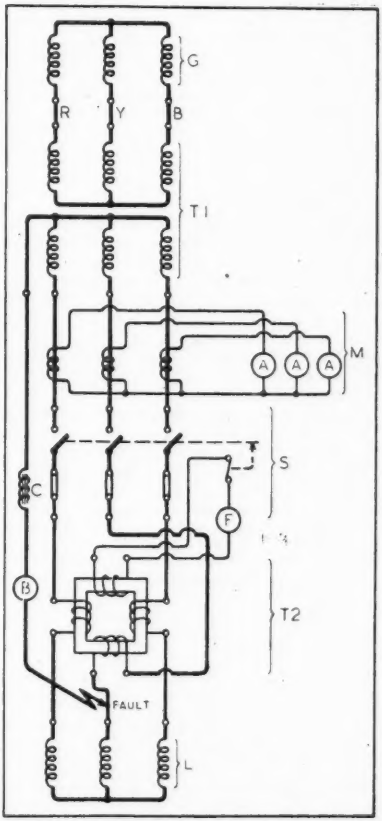


Fig. 8.—Experimental circuit for testing operating times of striker with varying resistance values

B, ammeter to measure fault current. C, variable choke coil to adjust fault current. F, low VA ammeter to measure spill current, *i.e.*, current passing through earth-leakage striker device. G, 550-kVA, 3-phase, 50-c/s generator. L, balanced 3-phase load; power factor approximately 0·4. M, ammeters and current transformers for line current measurement. S, 200-A switch-fuse unit fitted with earth-leakage striker device (main fuses replaced by copper links). T1, 550-kVA, 3-phase transformer; step down ratio 10/1. T2, 3-phase core-balance current transformer

A new scheme has, therefore, now been devised needing no relay or trip coil but employing an earth-fault striker, not unlike a fuse and no more costly. Like the relay, it needs current transformers (preferably of the core-balance type). The striker is connected as shown in Fig. 6. Such an arrangement can be applied in many ways not only to new gear but also to existing. If existing gear has no suitable trip coil (*e.g.* shunt or no-volt) then the device can be used to give an alarm. A simple container (Fig. 7) accommodates the core-balance transformer, the earth-leakage striker and an auxiliary or tumbler switch arranged either to make or break circuit. The container can be mounted in the run of existing cables without great difficulty. An arrangement of this kind should allow of compliance with I.E.E. Regulation No. 1,006 if this has not hitherto been achieved.

The normal instantaneous earth-leakage relay generally has a fixed setting, *e.g.*, 7½ per cent., and an earth leakage of 5 per cent. may be present on the system indefinitely without its operating. The new striker, however, has an inverse time characteristic and, in general, is expected to disconnect a faulty circuit with 7½ per cent. leakage in from 3 to 4 sec. With 5 per cent. leakage, the time may be of the order of 10 to 14 sec. while, with a 15 per cent. leakage, operation will be instantaneous.

Recent tests, with the circuit shown in Fig. 8, gave the following results. Variation in operating times was due to the experimental strikers purposely being given different resistance values.

Primary Line Amperes			Primary Fault Amps	Secondary Spill Amps to striker	Operating time Seconds
R	Y	B			
117	101	106	7·5	1·4	3
117	101	106	7·5	1·3	8
117	101	106	7·5	1·25	17
117	101	106	7·5	1·36	11
117	101	106	8·5	1·4	4
117	101	106	8·5	1·55	2
117	101	106	8·5	1·52	6
117	101	106	8·5	1·35	1

The tripping device forms the major operating component. Its action is distinguished from that of a fuse in that it depends entirely on heating and not on fusion. Fig. 9 shows a section of a typical device, in which a short heating element is suspended between two leads of low resistance. This element is of non-corrosive material of high specific resistance entirely embedded in a small chemical charge. The temperature setting of the charge is related to the section of the heating element in such a manner that a plunger device (driven by explosion of the charge) operates at definite current values within time limits. As indicated the relation between current and time can be shown by an inverse time-current characteristic. The minimum operating time is, for all practical purposes, identical to the instantaneous operation of a relay.

The heating element at "A" (Fig. 9) is in series with the leads "B." The plunger, indicated in two positions, moves through ⅜ in. and is locked out in its final position. Through the use of a short-time welding process efficient jointing of the low- and high-resistance metals has been ensured. The plunger striking force may be varied to suit the application; certain forms of tripping

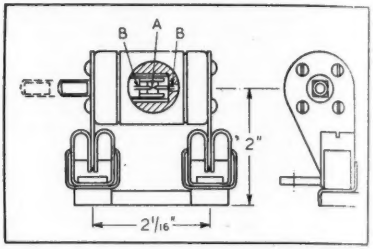


Fig. 9.—Arrangement of heating element. Clips and tags silver plates to give low resistance contact

may require 6 to 10 lb. while, to operate an auxiliary switch, a much lower force may be required.

The application of the new striker device may be extended to all circuits in which operation at predetermined but very low current values is required. The authors are indebted to Messrs. Johnson & Phillips, Ltd., and Electric Transmission, Ltd., for permission to publish the data set out in this article.

Lighting Code

A DRAFT British Standard Code of Practice covering the provision of artificial light for dwellings and schools has been issued as Chapter VII (A) by the British Standards Institution. Comments submitted up to August 12th, 1944, will be examined by the co-ordinating committee which will then submit a final draft for approval by the Codes of Practice Committee.

The Code discusses the general principles of illumination and includes tables of recommended foot-candles at 2 ft. 9 in. above the floor and minimum illuminating values compatible with good lighting for rooms of all kinds. It is submitted that every school installation should be designed by a lighting engineer and that consideration should be given to the installation of a system of photo-electric control so that the personal element is not involved in judging the need for supplementary lighting by day.

Notes on the relation of fixed fittings, a chart for determining sizes of lamps in living rooms and a series of definitions are given in appendices.

Organisations of the Industry—VI

Provincial Electric Supply Association

MEMBERSHIP of the Provincial Electric Supply Association is open to those companies which supply energy in areas outside the Administrative County of London under or by virtue of Provisional or Special Orders or Special Acts. The interests, therefore, which the Association represents are to a large extent peculiar to provincial companies, and it affords the only material means to those companies of association and mutual action, and of obtaining amendments and redress whenever legislation threatens or affects their affairs.

The Association celebrated its majority in 1938, having been founded in 1917 under the title of the Provincial Electric Supply Committee of Great Britain by the late Sir Harry Renwick; the first meeting of the Executive Committee was held on January 23rd, 1917. It is interesting to recall, in addition to Sir Harry Renwick, the names of the members of the original Executive Committee. They were Sir J. S. Harmood Banner, Mr. F. E. Gripper, Mr. H. B. Harvey, Mr. G. W. Spencer Hawes, Dr. J. A. Hosker, Sir Henry Mance, Mr. W. L. Madgen, Mr. K. A. Scott-Moncrieff, Mr. R. P. Sloan, Mr. J. G. B. Stone and Mr. J. C. Wigham. Mr. Scott-Moncrieff and Mr. Spencer Hawes still serve on the Executive Committee.

By E. G. Baker,
Secretary

On the death of Sir Harry Renwick in 1933, Mr. Scott-Moncrieff succeeded to the chairmanship of the Association; he resigned in 1934 but was persuaded to retain his seat on the Executive Committee, his place in the chair being taken by Mr. Selwyn S. Grant, O.B.E., who still occupies that position.

The membership of the Executive Committee is limited to twenty-one, including the chairman, and in addition to Mr. Selwyn Grant, Mr. Scott-Moncrieff, and Mr. A. J. Fippard as vice-chairman, the following gentlemen are now responsible for the direction of the Association:—Lord Erskine of Restormel, Lord Pentland, Sir Thomas Bethell, Sir John Dalton, Mr. H. J. Aylott, Mr. A. V. Barraclough, Mr. H. Bentham, Mr. W. Fennell, Mr. E. J. Guinness, Mr. G. W. Spencer Hawes, Mr. C. E. Maguire, Lt. Col. S. E. Monkhouse, Mr. G. R. J. Parkinson, Mr. F. Tyrrell and Mr. R. W. Wickham.

It will be seen that this Committee is fully representative of electricity supply throughout the country, and through its varied personnel is able to obtain and maintain contact in every sphere which is likely to affect the interests and progress of the members of the Association.

The Committee meets in London every month and is assisted in detail work by Technical and Secretarial Sub-Committees. The Association also has a " shadow cabinet " in the shape of a Parliamentary Sub-Committee which is able to meet at the shortest notice whenever occasion necessitates.

The scale of subscriptions is based upon capital expenditure, and the liability of members is limited to the payment of their annual subscription unless written consent is obtained to any special expenditure on their behalf. Practical advice is given to members by the Association's experts on rating, income tax, agreements for supply and a great variety of technical, fiscal and legal matters.

The Association is represented upon the National Joint Industrial Council and the National Joint Board for the Electricity Supply Industry, the British Electrical Development Association, the Conjoint Conference of Public Utility Associations, the British Standards Institution and on other organisations. Representatives are also nominated to serve on the many committees, technical and otherwise, which are set up from time to time by the Electricity Commissioners and the various electrical associations. The Association is a constituent member of the Joint Committee of Electricity Supply Organisations and values highly the work performed by that body. It is obvious that a Joint Committee of such a nature must be of great benefit to the industry as a whole.

Space does not permit a detailed account of the many notable achievements which have been accomplished by the Association in the Parliamentary sphere and in committee and the part it has played in every activity of the industry. The importance of the interests for which it stands ensures the participation of the Association at all conferences and committees affecting electricity supply undertakings. The practical and wide experience

of the Executive Committee is a guarantee that the interests of member companies are adequately represented, and that their statutory rights are not prejudiced by the Bills frequently promoted by other authorities.

Not Obstructive

Throughout the many conferences which have been held since the Act of 1919, right through to the present day with the prospect of further legislation, the Association has always insisted that it is in no way adverse to progressive change. It is convinced that the truly amazing progress which has been made during its life can be largely attributed to the spirit of enterprise which has animated its member companies despite the onerous difficulties and vexatious restrictions which have continually surrounded them. It must be remembered too, that the areas over which so many of the companies operate are sparsely populated and rural in character and the nature of the areas has called for the venturing of considerable capital expenditure.

The Association, together with the Incorporated Municipal Electrical Association, the London Electricity Supply Association and certain individual power companies has recently submitted to the Minister of Fuel and Power a "Memorandum on Electricity Distribution with Recommendations relating to Future Policy and Practice." This document resulted from the pooling of experience of recognised experts in the industry. It is not within the province of this article to discuss the question of ownership of supply undertakings, but the views of the Association are summed up in Clause 54 of the Memorandum, which states:—

> "Except in cases where there is mutual agreement between the parties concerned, the Area Committee should not recommend, nor should the Electricity Commissioners or the Minister have the power to make or confirm any Order, that an undertaking or part of an undertaking shall be transferred, unless they are satisfied that substantial and permanent benefit will thereby accrue to the general body of consumers of the undertaking or part of an undertaking proposed to be transferred."

It is difficult to see how any reasonable person can take exception to this recommendation, whatever his political views may be.

Power Station Protests

Public Inquiry into Durham Scheme

THE Minister of Town and Country Planning was asked on July 20th by Mr. Storey (Sunderland, U.) whether he had considered the appeal of the Bishop and Dean of Durham and others that a public inquiry should be held into the proposal of the North Eastern Electric Supply Co. to erect a power station in the vicinity of Durham Cathedral and Castle; and whether he could give an assurance that such an inquiry would be held.

Mr. W. S. Morrison replied that last April, under his statutory powers, he directed the Durham Rural District Council, the interim development authority, to refer to him any application which the North Eastern Electric Supply Co. might make for consent to the erection of buildings or the use of land in the Council's area for the purposes of a power station. The company had now made an application and it had been referred to him for decision. He would consider all the representations made before he gave a decision and the application would not be granted without the holding of a local inquiry.

Mr. Ritson (Durham E., Lab.) asked the Minister if he was aware that the public authorities were strongly supporting the company in this matter but did not object to a public inquiry. Mr. Morrison said he was aware that, as in most cases, there were two sides to this question.

Questions in Lords

The matter was raised by Viscount Cecil of Chelwood in the House of Lords on July 20th. He asked the Government "whether it was true that there was a design to erect buildings of a commercial character in a position which would interfere with the well-known beautiful view of the Durham Cathedral; and what steps, if any, they proposed to take to prevent this being done."

Lord Woolton, Minister of Reconstruction, gave a reply in almost identical terms to those employed by Mr. W. S. Morrison in the House of Commons.

Lincoln Extensions Opposed

Objections have also been entered against a proposal to extend the Lincoln Corporation's St. Swithin's power station on the grounds that the extension would interfere with the City's amenities and mar the view of the cathedral. The extension includes the erection of two cooling towers 200 ft. in height and it is against these that most of the protests have been directed.

When the matter was discussed at a meeting of the City Council recently it was decided by a majority of 15 votes against 11 that the towers were necessary and that there was no practicable alternative. The chairman of the Electricity Committee (Ald. J. W. Rayment) stated that the site had been selected by the Central Electricity Board as an ideal one. It was agreed that everything possible would be done to improve the appearance of the towers and the Lincoln correspondent of *The Times* reports that later the city electrical engineer (Mr. F. Newey) stated that the towers would carry a certain amount of ornamentation which would provide relief from the regular lines.

Patent Law

Desirable and Undesirable Modifications

By a Special Correspondent

A STRONG and representative commission under the chairmanship of Mr. Kenneth Swan, K.C., an eminent patent counsel, and including Mr. H. A. Gill, a past-president of the Chartered Institute of Patent Agents, is sitting to investigate the operation of our patent system. No doubt the outcome of its deliberations will be amendment of the law to meet certain shortcomings, and it behoves electrical institutions to ensure that their considered views are brought to its notice.

Among the views of questionable desirability now being mooted both in this country and in the United States is one that all patents should be subject to the provision that anyone could, as a right, become licensees under them. It may well be that some extension or clarification of the existing provision under which licences can be compulsorily granted by the Comptroller-General of Patents is needed where monopoly rights are abused or where patentees are unable to supply a demand, but to go beyond that seems unlikely to benefit either industry or the public. It seems scarcely fair that the benefits of an important invention, resulting maybe from years of expensive research, should be placed at the disposal of anyone who chooses to make use of it to his advantage.

Supporters of this proposal argue that the patentees would benefit by royalties paid by licensees and that the invention would be more fully developed in the commercial sense. To some extent this may be true, but patentees whose foresight and courage produce some attractive product, designed by them for the purpose of extending the output of their own works and keeping their own workpeople employed, are surely entitled, as a matter of equity, to enjoy to the full the comparatively short monopoly conferred by patent rights, so long as they can meet the demands of the market and do not abuse these monopoly rights.

Pooling of Patents

The pooling of patents is another subject of attack. No doubt it does bring hardships and can operate unjustly, but it can also confer great benefits. The vices of the system are not inherent in the pooling, but arise out of the terms of the licence granted by the pool, the mode of operation of the latter and the large number of patents of doubtful validity (and sometimes of notorious invalidity) included in any pool schedule.

An example of possible injustice in pool-licence conditions is when a licensee, whose licence is limited to complete apparatus, is required to undertake not to contest the validity of any of the patents comprised in his licence. Among the schedule of patents there may be obviously invalid patents purporting to cover certain components which the licensee might wish to make and sell, but as he had covenanted not to dispute the validity of a patent that was actually invalid, and his licence does not extend to separate components, he could have no defence in an action for infringement.

Another hardship arises when a manufacturer inadvertently infringes some quite minor detail which is the subject of an unimportant but probably valid patent. His only way of escape from an expensive action for infringement is to take the pool licence and pay the same tribute—or more because he is only a small man and cannot take advantage of the special benefits accorded to his bigger rivals—as does the manufacturer making expensive equipment and using many of the patents.

Adequate safeguard against such defects in present methods could probably be found by arranging for the terms of pool licences to be approved by some body, *e.g.*, the Board of Trade, or for right of appeal by the aggrieved person to the Comptroller-General of Patents. It is due to the British Licensing Pool under which the radio trade operates, to say that although the standard licence it issues invests it with vast powers it does not usually exercise these powers unreasonably. Nevertheless, it ought not to have such unrestricted powers.

Cross-Licensing

Cross-licensing differs from pool licensing materially in that the latter is open to all reputable and substantial concerns in a particular trade, whereas the former relates to the pooling of patents between specified individual concerns, the avowed object being to divide markets and set up monopolies for the sole enjoyment of the parties to the cross-licence. An advantage of cross-licensing is that the parties may pursue different lines of inquiry in research work, thus eliminating duplication of effort. On the other hand, such licences, where they are extensive and the subject of agreement between rival concerns in different countries, eliminate competition, frequently restrict export and are regarded by many merely as a conspiracy to maintain unduly high prices of essential

commodities. There would, however, seem to be no inherent vice in cross-licensing and exchange of information between individual concerns, so long as they are subject to control in cases of abuse.

Under the present system a large number, probably the majority, of patents granted are invalid. This is attributable in some measure to the inability of the Patent Office to refuse a grant if even a mere scintilla of novelty is claimed, unless the examiners can find complete and undeniable anticipation in some document available to the public.

A large body, comprising both official and public opinion, holds the view that the Patent Office should be empowered to refuse grants where the amount of novelty is very small. In my view, however, such a change of practice would be a mistake. There are adequate provisions under which such patents can be revoked and the refusal of a patent at so early a time as the application stage when there is, of necessity, no evidence available as to the importance of the mere scintilla of novelty, may do an irremedial injustice to the inventor and may, moreover, result in the strangling at birth of an industrial development of great importance to the public. I have had experience of more than one case in which patents, pronounced invalid on this ground by eminent counsel, have nevertheless resulted in the creation of very large businesses. Moreover, when the patents have ultimately come before the High Court they have been held, in the light of evidence by that time available, to possess sufficient subject-matter to justify valid patents.

Enlarging Grounds of Opposition

While I feel, therefore, that the powers of refusal of a grant should not be conferred upon the Patent Office, I do feel that the grounds of opposition might with advantage be enlarged, for instance, to give the Comptroller power to refuse a grant where actual prior use of an alleged invention is established beyond doubt. I have been many times involved in opposition proceedings rendered farcical because an article, alleged to be a patentable invention, was actually on the market, but since no prior published documents describing the article could be produced the Comptroller had no power to refuse a grant.

A matter which may not perhaps call so much for a change of law as a change of heart concerns the vexed question of the complete surrender of inventions of employees to their employers (including both the Crown and municipal authorities, who seem to be the greatest offenders) as a condition of employment. To impose such a condition is, in my view, not only vicious but unwise, since the benefits of inventions made in one works by the " true inventor " frequently accrue to another organisation because the inventor, knowing that if he discloses his invention to his own employers he will get nothing, passes his ideas on to someone else to patent. Of course the patent would be held invalid if the true facts of the matter could be brought to light, but short of a breach between the conspirators, there seems little likelihood of this happening.

Powers of the Crown

Maybe it is too much to expect that the drastic powers of the Crown in respect of the commandeering of inventions can be modified by a change of law, but any proposal which would enable its actions to be subject to open inquiry at the instance of an aggrieved patentee would be a welcome innovation. To have departments of the Crown infringe patents and authorise wholesale infringement by others and seek to justify their conduct by a mere assertion that " we are advised that no valid claim of the patent is infringed " does not accord with the commonplace Englishman's idea of justice. It would surely impose on the Crown no undue burden were Section 29 altered to include a provision whereby a patentee would be entitled to bring action in the appropriate Courts to establish the validity and infringement of his patent in the normal way and subject to the normal provision of the law. To say, as the Acts says in Section 29:—" A patent shall have to all intents the like effect as against His Majesty the King as it has against the subject " is farcical in view of the subsequent provisos of the Section or the manner in which those provisions are officially construed.

I am not at the moment considering Statutory Rules and Orders and " conditions " at present inserted in contracts, which are possibly justifiable as necessary wartime measures.

Other matters for consideration by the Committee are the excessive cost of patent litigation, which amounts almost to a denial of justice to the patentee of small or moderate means, and the need for increased and simpler facilities for the amendment of patent specifications after grant.

Corrosion Prevention in Packaging

THE Packaging Code, published by the British Standards Institution last December, is a practical handbook which deals in considerable detail with packaging practice, and with the issue of a new Section 3, entitled " Corrosion Prevention for Metal Parts," the handbook now provides a comprehensive guide to the subject. Section 3, which was not ready when the code itself was published, can be purchased separately from the B.S.I. Publications Department, 28, Victoria Street, London, S.W.1, price 2s. post free; it is perforated so that it can easily be inserted in the same binder as other sections of the code.

I.E.E. Elections

New President and Officers

IT is announced by the Institution of Electrical Engineers that **Sir Harry Railing** has been elected President for the 1944-45 session. As our readers are aware, Sir Harry Railing is chairman and joint managing director of the General Electric Co., Ltd., with whom he has been since 1905.

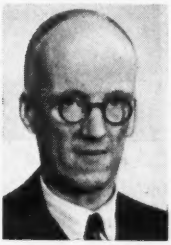
Before joining the company as chief of the test department at Witton, Sir Harry had had some years of practical experience in works practice and management in the United States and on the Continent. In 1907 he went to the company's head office as technical assistant to the late Lord Hirst. Four years later he was elected to the board and at the same time appointed general manager of the Witton group of works. He retained this position when he returned to Magnet House in 1933 to take over further administrative duties and he became joint manager in 1941. Upon the death of Mr. M. J. Railing in the following year he was appointed vice-chairman of the company and he succeeded Lord Hirst as chairman and joint managing director (with Mr. Leslie Gamage) in February last year.

Sir Harry Railing

Mr. W. J. H. Wood

Mr. E. S. Byng

Mr. H. Bishop



Mr. W. N. C. Clinch

Mr. F. C. Winfield

Sir Harry Railing is also chairman of the B.E.A.M.A. Council for the current year and he is a member of the management board of the Engineering Employers' Federation. He had previously served as vice-president of the Institution for two years.

The new vice-president is **Mr. W. J. H. Wood**, a director and engineer-in-chief of the County of London Electric Supply Co., Ltd., and associated companies. **Mr. E. S. Byng**, vice-chairman of Standard Telephones & Cables, Ltd., has been re-elected honorary treasurer.

The new ordinary members of the Council are **Mr. H. Bishop**, Controller (Engineering), B.B.C.; **Mr. W. N. C. Clinch**, general manager, Northmet Power Co.; and **Mr. F. C. Winfield**, chief electrical engineer, Merz & McLellan, Newcastle, representing members. **Dr. R. W. Sillars**, research engineer, Metropolitan-Vickers Electrical Co., is the associate member representative on the Council.

The chairman of the Installations Section will be **Mr. G. O. Watson**, Lloyd's Register of Shipping, with **Mr. Forbes Jackson**, L.C.C., as vice-chairman. **Dr. W. G. Radley**, Post Office Research Department, Dollis Hill, and **Mr. S. H. Richards**, chief meter inspector, Electricity Commission, become chairman and vice-chairman, respectively, of the Measurements Section, while the chairman of the Radio Section is to be **Mr. H. L. Kirke**, B.B.C., with **Mr. C. E. Strong**, Standard Telephones & Cables, as vice-chairman. The Transmission Section chairman is to be **Mr. H. W. Grimmitt**, Electricity Commission, and the vice-chairman **Mr. E. T. Norris**, Ferranti, Ltd.

Public Transport Association

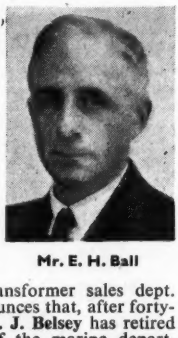
SPEAKING at the annual general meeting of the Public Transport Association on July 14th, Mr. T. E. Thomas, the chairman, said that at December 31st, 1943, the membership stood at 385, comprising 109 company operators, 24 municipal operators, 138 contractors, 2 extra-ordinary members, 105 associate members, and 7 overseas members. The total number of vehicles owned by these members was 40,927. Technical committees had done much valuable work and memoranda had been submitted to the Ministry of War Transport's committees dealing with traffic signs and the design of roads in built-up areas. Other activities concerned facilities for major coach-work repairs, the supply of labour to the road transport industry, dimensions of public service vehicles and legislation relating to war damage to public utility undertakings.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Central Electricity Board has promoted **Mr. J. G. Bentley,** B.Sc., A.M.I.E.E., senior assistant operation engineer, to be operation engineer for the South-East England and East England Areas as from August 1st, in succession to **Mr. A. R. Cooper** who, as already reported, becomes operation engineer, head office. **Mr. C. Sykes,** who has been the Board's operation engineer for the Central England Area since 1930, is retiring for health reasons at the end of August, and will be succeeded by **Mr. P. W. Cash,** B.Sc., A.M.I.E.E., chief assistant operation engineer, head office.

Mr. E. H. Ball, manager of the transformer sales department of the British Thomson-Houston Co., Ltd., has been elected a director. Mr. Ball received his electrical training at Faraday House, where he received an honours diploma. His practical training was received at Crompton's, Chelmsford; Belliss & Morcom, Birmingham; and Bruce Peebles, Edinburgh. He joined the B.T.H. Co. in 1923 as commercial engineer in the export department. He was made head of the industrial section of the export department in 1927, and became in 1932 manager of the transformer sales dept.



Mr. E. H. Ball

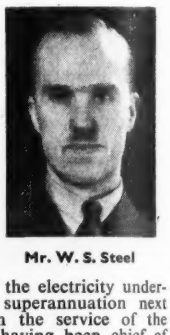
The company also announces that, after forty-two years' service, **Mr. W. J. Belsey** has retired from the managership of the marine department, but has been retained in a consulting capacity. Mr. Belsey joined the company in 1902 and was at the Rugby works for about eighteen months. In April, 1903, he was made manager of the Belfast office and two years later also manager of the Glasgow office. During the last war he went to the U.S.A. to see what the General Electric Co. in Schenectady was doing in connection with main propelling machinery. As a result the B.T.H. marine department was formed in Rugby in 1919 and he became manager. Mr. Belsey has played a prominent part in the application of electric drive to ships and during his managership of the department the company supplied turbo-electric equipment for the P. & O. liners *Viceroy of India, Strathnaver and Strathaird.*

Mr. W. S. Steel, assistant manager of the marine department, who succeeds Mr. Belsey, was born in South Africa and was educated at the Witwatersrand University, Johannesburg, where he obtained the vice-chancellor's gold medal. Afterwards he went to the B.T.H. Co.'s works at Rugby as a student and on completing his course he became an assistant in the AC engineering department, and subsequently held positions in the supply department, which afterwards became the industrial sales department. He then went out to Wilson & Herd, Johannesburg, the B.T.H. representatives in South Africa, as engineering representative for the B.T.H. Co. He returned to this country during the war and was made assistant manager of the marine department last September. During 1930 he visited the U.S.A. and Honduras as guarantee engineer for the B.T.H. turbo-electric ship propulsion plant in the s.s. *Platano,* and in 1931 he went to Australia in the same capacity in the s.s. *Strathnaver.*

Islington Borough Council Electricity Committee has extended the services of **Mr. A. P. MacAlister,** the borough electrical engineer, for twelve months.

Manchester Electricity Committee on July 19th placed on record a resolution of thanks and appreciation to **Mr. H. C. Lamb,** chief engineer and manager of the electricity undertaking, who retires on superannuation next month. He has been in the service of the Corporation since 1902, having been chief of the Department since 1925.

Mr. W. J. Belsey



Mr. W. S. Steel

Mr. H. V. Pugh (not "R. V." as stated last week), who has been appointed deputy chief engineer to the Manchester Corporation Electricity Supply Department, is forty-four years of age. He was educated at the Manchester College of Technology and served an apprenticeship with the Metropolitan-Vickers Electrical Co., Ltd., by whom he was subsequently employed as a power station plant erection and maintenance engineer. In 1930 he was appointed to take charge of the Ogmore Vale and Resolven stations of Cory Bros. & Co., South Wales, and five years later he joined the South Wales Electric Power Co. as deputy station superintendent at the Upper Boat power station, becoming superintendent in 1937 and generation engineer later. He is an associate member of the Institutions of Electrical and Mechanical Engineers.

Mr. Pugh is succeeded by **Mr. E. McCabe,** who has been employed by the Wessex Company since 1942. Mr. McCabe is thirty-five and studied at the Regent Street Polytechnic, proceeding from there to the Test Department of the British Thomson-Houston Co., Ltd. He joined the staff of the Cornwall Electric Power Co. in 1928 as mains assistant, subsequently becoming assistant engineer (power station), control engineer, and substations and

meters engineer. In 1939 he was appointed power station superintendent and three years later took up a position with the Wessex Company. Mr. McCabe is an associate member of the Institutions of Electrical and Mechanical Engineers.

Mr. McCabe's place with the Wessex Company is to be taken by **Mr. P. L. Lutte,** his deputy. Mr. Lutte was previously an engineer officer in the Royal Navy.

Mr. J. Middleton, power station superintendent with the Newcastle and District Electric Lighting Co., Ltd., was recently presented by Mr. F. A. Orchard, the company's chief assistant, with gifts from his colleagues on the occasion of his retirement. He joined the company in 1904.

We are pleased to learn that **Mr. L. S. Hargreaves,** managing director of Aerialite, Ltd., has quite recovered from his recent illness.

Mr. Joseph Sales, who has just retired from the Stafford works of the English Electric Co., Ltd., where he has been employed as a toolmaker, after fifty-nine years' service, has been presented by Mr. J. W. C. Milligan (manager), on behalf of the directors and management, with a testimonial inscribed with the years of service and the date of presentation. Mr. Sales entered the Siemens works at Woolwich in 1885, and transferred when the Stafford works were opened in 1903.

At the annual meeting of the Electric Construction Co., Ltd., last week, **Messrs. Charles Reid** and **W. M. B. Furniss** were elected directors of the company. Mr. Reid is a member of the firm of James Meston & Co., the company's auditors, who are now succeeded by Messrs. Hay, Akers & Hay. Mr. Furniss has been manager of the company since the beginning of 1943; he has been with the company for about nineteen years.

A presentation was recently made to **Mr. G. Humphreys** upon his retirement from the position of area officer (No. 10 Area, London) of the Electrical Trades Union. He had been connected with the union for forty years.

Mr. L. D. Bennett has resigned from the board of the Telephone & General Trust, Ltd., owing to pressure of other business. **Mr. C. E. Bailey,** managing director of the Cia. Anon. Nacional Telefonos de Venezuela, has joined the board.

The Institute of Fuel announces that **Dr. E. W. Smith,** C.B.E., is to continue as president for another year. **Mr. H. L. Pirie,** who has been one of the honorary secretaries of the Institute since its inception, has been made an honorary member.

Mr. F. L. Sharpe, M.I.Mech.E., M.I.P.E., has been co-opted to the board of Vactric, Ltd., and its subsidiaries and has been appointed general manager. Mr. Sharpe was formerly the managing director of Briggs Motor Bodies, Ltd.

Obituary

Mr. D. R. Friend.—The death occurred on July 12th at the age of forty-nine, of Mr. Douglas Richard Friend, sales superintendent to the Hull Corporation Electricity Department. Mr. Friend, who was born at Chester, obtained his early technical experience at the works of Chamberlain & Hookham, Ltd., and the Walsall Corporation Electricity Department. He served throughout the last war, winning the Military Medal. He was appointed meter superintendent at Hull in 1929, being promoted to sales superintendent in 1938. Besides commanding a platoon of the Home Guard, Mr. Friend's private interests included the organisation and instruction of the Electricity Department's Dramatic Society.

Mr. William Thomas Kelly, until this year foreman of the Electrical Branch, Lyness Naval Base, died recently. He had been thirty-five years in Admiralty service and was awarded the British Empire Medal (Civil Division) in the New Year Honours List.

Mr. E. S. Colley, who retired from the post of assistant generating superintendent at the Battersea Borough Council's generating station in April, died at his new home at Bridlington on July 9th.

Will.—Baron Graevenitz, a director of Siemens-Schuckert (Great Britain), Ltd., left £23,094 (net personalty £13,787).

Power Supply in Brazil

DESPITE the difficulties being experienced as the result of the war, a further increase in the demand for electric power supply was successfully met during last year by the Brazilian Traction, Light & Power Co., Ltd., which, through its affiliated concerns, controls the supply in the cities of Rio de Janeiro, São Paulo and Santos. It is mentioned that in September last year the Brazilian National Council of Water and Electric Energy passed an Act which provides that in the Rio region all applications for a supply of 40 kW and over and extensions of service of like amount, except in the case of military establishments, shall be subject to prior authorisation by the Council.

The report shows that the aggregate sales of power during 1943 in the three areas amounted to 2,148 million kWh as compared with 1,984·5 million kWh in the preceding year, an advance of over 8 per cent. During the twelve months the number of consumers increased from 622,051 to 654,375; the capacity of the generating plant from 591,509 to 612,570 kW; and the connected load from 1,392,522 to 1,482,911 kW.

As regards construction works during 1943, the report records that further progress has been made with the doubling of the height of the dam at the Serra hydro-electric plant, which serves the São Paulo system, and which will increase the effective water storage capacity sixfold. In connection with this work many problems have had to be surmounted, among them being the training of local divers to work at a depth of over 135 ft. and the construction and placing in position of 75-ton welded caissons designed to withstand a total pressure of nearly 4,000 tons. The application for a permit for the acquisition of an additional 67,000-kW turbine and generator for the Serra plant has not yet been finally passed; on the other hand, the priority permit for a third 35,000-kW unit for the Lages plant which serves the Rio system has been granted. An auxiliary plant of about one eighth the output of the Lages installation was recently officially authorised, but the necessary priority permits have not yet been obtained.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Post-war Development

AS one of those responsible for the preparation of both the White Memorandum of the Joint Committee of Electricity Supply Associations and also the Brown Memorandum of the I.M.E.A., I would like to make one or two comments on the last paragraph of "Electron's" letter in your July 14th issue relative to the Brown Memorandum.

It will be remembered that Lord Portal, speaking on behalf of the Government in the House of Lords on June 17th, 1942, laid special stress on the necessity for more uniform charges to the consumer in the post-war period and the Minister of Fuel and Power has, on a number of recent occasions, repeated this statement. In these circumstances the members of the Special I.M.E.A. Committee kept this fact very much to the fore when preparing the Brown Memorandum. It should here be stated that the Brown Memorandum was prepared by a Committee on which the selected station owners had a substantial majority (selected station owners, 6; non-selected, 4), and consequently they were at any time in a position to veto any proposals with which they disagreed, but the Memorandum was unanimously approved.

After long and careful consideration, the Committee came to the conclusion that the only way to meet the Government's expressed views on the question of charges to the consumer, was to transfer all generation to the C.E.B., who would then be in a position to pool transmission charges (including secondary transmission) and supply every authorised undertaker at his own busbars on a uniform basic tariff.

Since the preparation of the Brown Memorandum, many of the selected station owners appear to have had second thoughts and changed their views and, whilst apparently being unable to put forward any alternative constructive scheme to secure the uniformity of charges desired by the Government, now suggest that it would be unfair to the consumers in the large towns and densely populated areas to have to pay a slightly higher price in order that the consumers in the smaller, less densely populated or rural areas may obtain supply at uniform tariffs. One wonders what view the Minister will take of this attitude.

Finally, "Electron" suggests that the proposed transfer of generating stations to the C.E.B. is a revolutionary change, but is it? The C.E.B. already exercises such a measure of control in the operation of the selected stations that it would appear that the Brown Memorandum merely advocates an evolutionary change. Yes, "Electron," I think you can rest assured that the I.M.E.A. Council, after the long and serious consideration it has given to these proposals, *does* know where it is going and, what is more, has every intention of getting there.

A. J. C. DERENZI.

Newcastle-under-Lyme.

Plugs and Sockets

WITH reference to the plea put forward by Mr. Raynor in your July 14th issue for the standardisation of the connector used for connecting the flexibles of irons, kettles, etc., it may be pointed out that this article has not been overlooked. The dimensions of the oval type of connector are laid down in B.S. 562, published in 1934. This standard has been adopted by a large number of manufacturers, but it is unfortunately true that some manufacturers still adhere to their own particular design of connector, usually because it incorporates some form of safety device. It is to be hoped that after the war these manufacturers will redesign their equipment so that, while not sacrificing the advantages of safety devices, standard interchangeable connectors complying with B.S. 562 can be used.

*London, S.W.*1. P. GOOD, *Director*,
British Standards Institution.

Intensive Research

I HAVE read with great interest the article by Mr. R. W. Steel in your July 14th issue and his cogent arguments in favour of increased support for research by the electricity supply industry and of the E.R.A. in particular. All interests appear to-day to be falling over one another in praise of research and appreciation of its possibilities as one of the most reliable means of securing future prosperity.

The arguments in favour of co-operative research have been advanced many times, but it is well to recognise, having regard to the very wide call for an expansion of research activities in the post-war period, and indeed to the many particular proposals already formulated, that only a part of what should be achieved will be done unless there is a far greater pooling of research than we have yet experienced. There will not be enough men to go round. It takes time to train new men and create new effective facilities. One may reasonably hope, however, to carry over into the post-war period the

splendid co-operation which has existed behind the scenes during the war.

If industry decided to pool with the E.R.A. only an additional 10 per cent. of its research work, this alone would double the scale of working of the E.R.A. The Association, however, already has proposals for research before it in the form of extensions of its recent activities which would alone require doubling its scale of operations, and this before any serious consideration has been given to particular post-war problems with which the electrical industry will be faced and for which research will undoubtedly be required.

Thus the problem facing the E.R.A. is quite a serious one and it is fortunate indeed that the Association has been able during the war to purchase adequate land and to maintain continuity of its normal activities on a scale which affords an adequate basis for such expansion.

It is satisfactory to note that the Government is entirely sympathetic, but surely the scale of support to be obtained from the Government can hardly be explored before the industry has itself indicated its own requirements and intentions. This is a matter which is now receiving very close attention by my Council and no doubt in the near future representatives of the different sections of the industry will formulate an adequate scheme.

*London, W.C.*2. E. B. WEDMORE,
Director, British Electrical and Allied Industries Research Association.

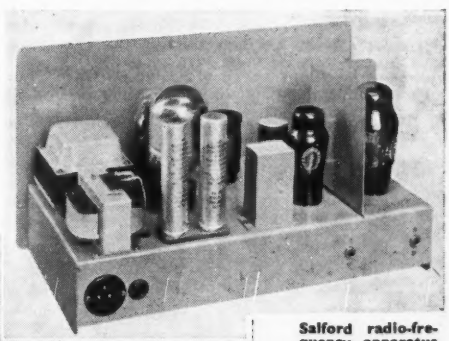
New Crack Detector

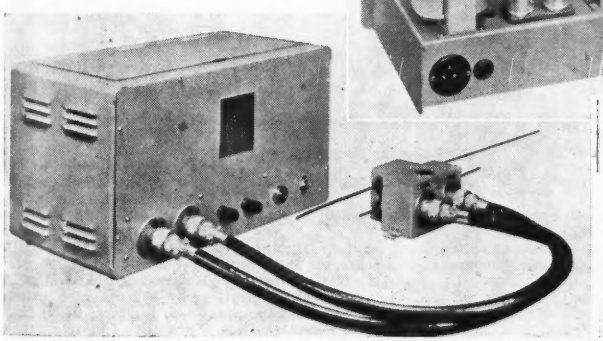
Radio-frequency Apparatus

APPARATUS of entirely new design for detecting cracks in metals is announced by SALFORD ELECTRICAL INSTRUMENTS, LTD., Peel Works, Silk Street, Salford, 3, Lancs. It depends for its action upon the "skin effect" which results from the tendency of AC to concentrate in the surface layers of a conducting material. While the effect is noticeable at as low a frequency as 100 c/s, it becomes very much more evident with increase of frequency. Thus by appropriate choice of frequency it becomes possible to detect surface cracks of extremely shallow depth.

The instrument incorporates a radio-frequency generator in a rectangular case, which is provided with leads of any convenient length with socket ends into which may be plugged interchangeable coils for examining different sizes of wire, strip, or bar stock of any cross-sectional shape, which may be passed through the detecting coils in continuous lengths at any speed up to 1 ft. per second.

The indicating device may be a lamp, bell, or meter which can be calibrated to indicate the depth of crack for any particular material. If desired, the equipment may be arranged to stop the mechanism feeding the material into the detector when a crack is revealed; alternatively, means may be provided to reject defective portions. The detector may be used for testing material from 0·05 in. to 2 in. diameter or width and will detect cracks from a minimum depth of 0·0005 in. upward. It is suitable for testing ferrous or non-ferrous metals. When fitted with a meter it may be calibrated to indicate the depth of crack for any particular material. The standard model is suitable for operation from the AC mains, but special models for energisation with DC can be provided. The overall dimensions are approximately 16 in. long by 9 in. high by 10 in. deep.





Salford radio-frequency apparatus for detecting cracks in metals

COMMERCE and INDUSTRY

Higher Cable-making Wages. Post-war Installations.

Wages in the Cable Making Industry

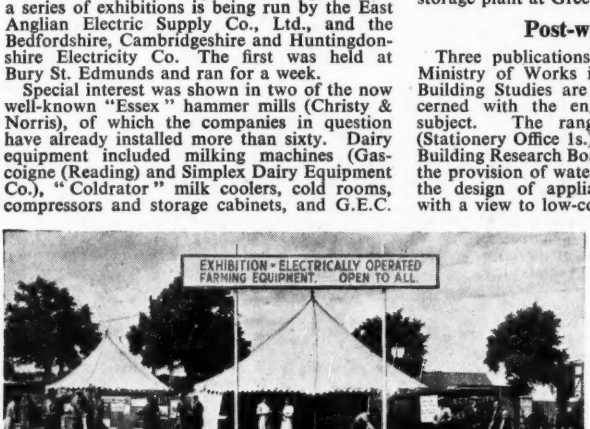
IN accordance with a resolution of the Joint Industrial Council for the Electrical Cable Making Industry, advances in wages are to be made throughout the industry on the third pay day in July. Both male and female adult time and piece workers will receive 4s. more per week of 47 hours, proportionate amounts being fixed for younger workers.

In the case of women who are employed on men's work, the provisions of the Substitution Agreement of January, 1944, will apply. Adult males in Districts Nos. 1 and 2 employed on occupations in Grade 1 already in receipt of the temporary increase of 1s. per week granted in March, 1944, will receive an advance of 3s. per week of 47 hours.

East Anglian Farming Exhibition

To assist farmers to decide which plant is most suitable to their particular requirements a series of exhibitions is being run by the East Anglian Electric Supply Co., Ltd., and the Bedfordshire, Cambridgeshire and Huntingdonshire Electricity Co. The first was held at Bury St. Edmunds and ran for a week.

Special interest was shown in two of the now well-known "Essex" hammer mills (Christy & Norris), of which the companies in question have already installed more than sixty. Dairy equipment included milking machines (Gascoigne (Reading) and Simplex Dairy Equipment Co.), "Coldrator" milk coolers, cold rooms, compressors and storage cabinets, and G.E.C. sterilisers, churn stools, and steam raising units. Welding machines (G.E.C. and Triangle Products) were also featured.



Electrical farming exhibition at Bury St. Edmunds

Among cookers and various types of small apparatus were an electric cooker which has been in use for seven years, and a vacuum cleaner and a washing machine, both of which have been in use for ten years. Live chickens in hovers illustrated the relative advantages of paraffin and electricity for heating, while pumping equipment included portable and submersible units. There were also sheep shearing machines, various types of portable drills, and other tools useful to the farmer, as well as a Wilson electric vehicle which has been in general use by the company in the Bury St. Edmunds district for eight years.

A working model and photographs were used to demonstrate crop drying plant manufactured by Ransomes, Sims & Jeffries, and there were also several interesting photographs of a power station, offices, and some of the showrooms; and displays of h.v. and l.v. mains, street lighting and flood lighting, farming and refrigeration. During each exhibition demonstrations are given of cooking of "Farmhouse Fare"; milking, milk cooling, storage, bottle washing, and sterilising; repair of farm machinery with the use of electric welders; pumping; grass cutting; grinding and horticulture.

In the case of Bury St. Edmunds the War Agricultural Executive Committee held a conference at the exhibition, and afterwards they and members of the companies' staffs conducted farmers to inspect crop drying and grain storage plant at Greene King's Brewery.

Post-war Building

Three publications issued this week by the Ministry of Works in the series of Post-War Building Studies are of interest to those concerned with the engineering aspects of this subject. The range of No. 4, Plumbing (Stationery Office 1s.), which is a product of the Building Research Board, is regarded as covering the provision of water supply and drainage and the design of appliances for those purposes with a view to low-cost housing. Preference is expressed for 40-gal. rather than 25-gal. hot-water tanks in view of an expectation of longer life in service. The 42-page booklet contains seven plates of diagrams.

The second study, Mechanical Installations (2s.), has been prepared by the Institution of Mechanical Engineers. It runs to 120 pages and includes six plates, five of which relate to lifts and the other to alternative forms of heating circuits. Mr. Robert Chalmers was chairman of the Committee responsible, on which Messrs. J. I. Bernard and V. Watlington represented electrical interests, which were looked after on the six sub-committees by Messrs. L. S. Atkinson, G. H. Church, H. W. Fulcher, E. H. Nash and the late H. Marryat. The Report is divided into five parts dealing with:—Installation engineering in relation to building; lifts; cooking (except for homes), laundry appliances and refuse disposal; heating, ventilation and air-conditioning (including boiler plant); wells, bore-holes and fire-fighting appliances and pumping; power plant; refrigeration.

A third booklet of 72 pages (1s.) is the work

of the British Non-Ferrous Metals Research Association. It deals with the properties and specific uses of non-ferrous metals and makes various recommendations for future investigation.

A Works Council Comes of Age

Twenty-one years ago Mr. W. L. Barber, founder of the Midland Electric Manufacturing Co., Ltd., established a works council with joint representation of management and employees. This council has operated continuously ever since and to it can be credited much of the goodwill which exists in the M.E.M. works. Owing to the expansion of the company a revised constitution was agreed between the employees and the company about two years ago, providing for a council of fourteen elected representatives covering all sections of the works, with six representatives nominated by the management. The management representatives include a member of the board of directors and two foremen.

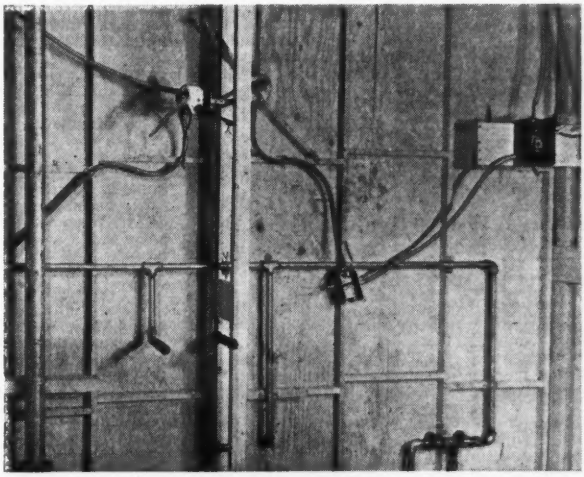
The chairman, who at the present time is Mr. W. J. Barber, the works director, is permitted to exercise the privilege of allowing some other member of the council to act as chairman for any particular meeting and usually a different member of the council presides at each meeting. Joint secretaries are appointed by the management and by the employees' representatives. Regular meetings are held each quarter, but additional meetings are called at short notice to discuss urgent matters. Typical items covered are welfare, working conditions, general matters relating to production, and general wage standards.

Housing in America

As new homes have had to be provided for over 10,000,000 people who have moved to war production areas in the United States since 1940, the country cannot be said to be without experience in combating housing shortage. The problems arising were not unlike those facing Great Britain to-day, so that an exhibition on American Housing in War and Peace which is being held at the Royal Institute of British Architects, 66, Portland Place, London, until August 26th, should prove of particular interest to post-war planners.

Consisting of a series of photographs assembled by the Museum of Modern Art in New York, the exhibit portrays various experiments in mass housing, particularly under emergency conditions. Considerable success has been achieved with assembly-line construction of prefabricated houses, with "demountable" homes which can be moved to sites where they are urgently needed, and with establishing efficient and comfortable caravan communities for times of immediate need. Interesting use has also been made of newly developed materials such as plastics.

Probably the most significant factor in the production of large-scale projects was the organisation of the building process. Many of the large construction companies which had previously built only skyscrapers and factories turned their attention for the first time to the building of houses, adapting their time and labour-saving methods to this new field. Small house builders were forced to adopt the same methods in order to compete. Jobs were carefully planned for the most efficient use of man-power, materials and machinery. Large operations were made possible by the training of crews to perform single operations proficiently, by the use of power tools and heavy equipment, and by the mass purchase of material. Houses have been redesigned and parts standardised to conform to new methods of fabrication on site and in the factory. Definite attempts have been made to rationalise mechanical equipment, and prefabricated walls have been built in the factory complete with the electric wiring and plumbing installations.



Electric wiring and plumbing already installed in a section of a prefabricated plywood wall forming part of a bathroom and kitchen

Rubber Conference

It has been announced that a Conference is to be held in London between representatives of the United Kingdom, United States and Netherlands Governments to engage in exploratory talks as to the probable nature of the problems of both crude and synthetic rubber which will face these Governments after the

war. A tentative programme of studies will be drawn up to provide a basis for further discussions and the formation of a committee will be considered.

As an indication of the magnitude of the problems likely to arise, *The Times* mentions that in May the output of synthetic rubber in the United States and Canada reached 70,000 tons and the monthly production is expected to rise to 85,000 tons before the end of this year. Before the war the world's plantations were capable of producing 1,500,000 tons of crude rubber a year and may be expected to reach that figure again after restoration.

Plugs and Sockets

With reference to the recent discussion on plugs and sockets in our correspondence section, Mr. P. S. Cattle, director of Higgins & Cattle, Ltd., informs us that he has made double-pole three-pin fused plugs to British Standard Specification for the last twelve years. The fuses used are Siemens "Z" type which allow of suitable gauges being fitted to control the amperage of the fuses, in six sizes varying from 0·5 to 15 A. The body of the plug is made of "Tufnol" or hardwood, with brass pins, phosphor-bronze springs and removable cap and inspection window for ascertaining if the fuse is blown. Only one insulated nut has to be removed to replace fuses. All wiring is disconnected from the plug top during the changing of fuses. A flexible end, with a clamp to hold the insulation, protects the wires. The photograph shows the type used for small power drives requiring very accurately fused circuits.

Double-pole three-pin fused plug for small power drives

Irish Lamp Quota Restrictions

The Government of Eire has made an Order continuing until June 30th, 1945, the suspension of quota restrictions imposed by the Control of Imports (Quota No. 31) Order, 1936, which covers certain electric filament lamps.

Iron and Steel Prices

The Iron and Steel Control has had under consideration the desirability of publishing copies of the price schedules in force under the Iron and Steel Control Order for the various sections of the industry. The essential features of certain of the related schedules have now been summarised and relate to: Alloy steel; stainless steel; bright carbon steel bars and flats; bright mild steel wire (straight lengths); and wire products (wire netting and second-hand barbed wire). It is hoped shortly to make available similar summaries of the schedules relating to other iron and steel products in wide general use. The full schedules are, of course, available for inspection at the Control offices, but it is thought that these summaries, which cover the main points in the pricing of the steel products concerned, will be of general convenience for reference purposes. Further copies can be obtained from the Control on application.

Wycombe Model Kitchen

A one-third scale model of a post-war kitchen fitting designed by Mr. C. T. Westlake, the borough electrical engineer, and his staff is now on view at the Corporation's electricity showrooms in Frogmoor, High Wycombe. Designed for use in a moderate-sized kitchen, the full-sized unit would occupy a wall-space of 10 ft. 6 in. It comprises an oven, two hot-plates and a grill, a refrigerator, clock and a plug for an iron, kettle, etc. The oven is placed at working level, alongside the hotplates and grill, so that the working space is at the same level. There are plenty of drawers and cupboards, and the stainless steel sink has two draining boards. No provision has been made for a washing machine, drying cupboard, etc., as Mr. Westlake does not consider the Government would spend the money on these articles or make a kitchen large enough to contain them.

Contract Price Adjustment Formulæ

We are informed by the British Electrical & Allied Manufacturers' Association that the following are the latest figures for its contract price adjustment formulæ:—(a) "Rates of Pay": the rate of pay for adult male labour at July 22nd shall be deemed to be 90s. 6d. (b) "Costs of Material": the index figure for intermediate products last published by the Board of Trade on July 22nd is 176·3 (against 176·2) and is the figure for the month of June.

Franco-British Electrical Co.

An alteration in the objects of the Franco-British Electrical Co., Ltd., publicity sign manufacturers, of Oxford Street, London, W., extending the kinds of business the company can carry on, was confirmed by Mr. Justice Cohen in the Chancery Division of the High Court on July 17th. Counsel for the company said that its main pre-war business was manufacturing and dealing in illuminated signs and because of the war that business had naturally very largely come to an end. The object of the application was to obtain power to carry on certain other business which, under existing circumstances, might be conveniently or advantageously combined with the company's business.

Under the altered objects the company, said counsel, would have power to carry on business, among other things, as engineers, illuminating and decorating contractors, general merchants, sign makers, advertising specialists, glass manufacturers, builders, shop and office fitters, manufacturers and dealers in wireless sets and machinery and appliances of all kinds, and as workers in metals, alloys, plastics and rubber. The company could also manufacture and deal in munitions and products and articles required for the efficient prosecution of any war in which the United Kingdom is engaged or for

maintaining supplies and services essential to the life of the community. It may purchase or acquire patents and it can construct and manage any roads, railways, bridges, docks, gas works and other works which might be considered directly or indirectly conducive to any of the company's objects.

Lighting a Carriage Works

A scheme for the relighting of the Gloucester Railway Carriage & Wagon Co.'s works has recently been carried out with highly satisfactory results by John Newth, Ltd. "Mazda" 500-W lamps in "Mazdalux L.T." type dispersive reflectors are used throughout. The mounting height is 15 ft. above floor level, the spacing 19 ft. by 16 ft. 6 in. staggered, and the average illumination 11 foot-candles.

Trade with French West Africa

Arrangements have been made in Dakar for a gradual resumption of private trade between the United Kingdom and French West Africa. Private imports into French West Africa will, however, be limited both in respect of the goods affected and the channels used. Applications for licences to export goods must be accompanied by Certificates of Essentiality issued by the French Authorities in London (Direction de l'Armement, 3, St. James's Square, S.W.1) but firms should not seek such a certificate unless the order has received an import licence from the authorities at Dakar.

Purchase Tax Responsibility

The attention of traders dealing in goods chargeable with purchase tax is specially directed to Section 17 (2) of the Finance Act, 1944, which has just become law. Under this Section it is now an offence, subject to heavy penalties, for anyone to acquire possession of, or otherwise deal with, any goods, having reason to believe that the tax thereon has been, or will be, evaded. Hitherto there has been no legal obligation on retailers or other unregistered traders when buying chargeable goods, to take any steps to satisfy themselves that the tax will be duly paid.

Wrongly Wired Switch

At Edinburgh Sheriff Court on July 19th, the Scottish Co-operative Wholesale Society, Ltd., Junction Mills, Leith, pleaded guilty to an offence under the Factory Act, 1937. It was stated that an accident occurred on January 22nd last whereby a man sustained a shock caused by an electrical defect in the wiring of a switch. An agent explained that the man had used a lamp in which some wires were exposed; if he had used one of the accepted type the accident would not have occurred. The offence amounted to two wires being crossed, in a building where miles of electric wire were installed. The injured man was now back at his normal duties. The Sheriff imposed a fine of £10, and granted expenses of 13s. 4d.

Fatality

The Pembrokeshire coroner returned a verdict of "Died from shock, following electrocution accidentally caused when he gripped a live electric cable" at an inquest held recently on Robert Livingstone Bracken Robinson (24), an electrical fitter. Deceased was working on a platform upon which rested a transformer when the accident occurred, and he fell a distance of 20 ft.

Trade Publications

Newman Motors, 32, Victoria Street, London, S.W.1.—Priced catalogue C.46, dealing with totally enclosed machines, fan-cooled, ranging from ¼ to 25 HP two- and three-phase, 50 cycle; also ¼ to 1 HP single-phase 50-cycle motors, including leading dimensions of all frames.

Feedwater Specialists Co., St. Paul's Square, Liverpool, 3.—Illustrated brochure descriptive of "Pluvite" (chemical mixing) water conditioning plant.

Copies of these publications will be sent to bona fide trade applicants on request.

Annual Holidays

The works of B. Kimber, Allen & Co. will be closed from July 28th to August 8th.

TRADE MARK APPLICATIONS

RECENT applications for British trade marks include the following, objections against which may be entered within one month from July 19th:—

RONDEX. No. 628,106, Class 7. Electric washing machines. No. 628,107, Class 11. Electric refrigerators and electric radiators.—C.V.A. Jigs, Moulds & Tools, Ltd., Portland House, Hove, Sussex.

GLISSA. No. 628,053, Class 9. Electric collectors, electric contact and conducting devices, and electrical contacts.—Aktiebolaget Pulverkemi, Thulegatan 15, Stockholm, Sweden.

TELEION. No. 628,516, Class 9. Electric-discharge devices, and parts thereof not included in other classes.—Romac Radio Corporation, Ltd., Romac Works, The Hyde, Hendon, London, N.W.9.

CADRON. No. 628,565, Class 9. Electrolytic apparatus for the prevention and removal of scale and similar incrustation in pipe installations.—A. S. Gush and A. J. Peirpoint, trading as the Cadron Water Treatment System, 25, Haymarket, London, S.W.1.

NUELAM. No. 628,894, Class 17. Electric insulating material and electric insulating sleeving made therefrom.—United Ebonite & Lorival, Ltd., Springside Works, Little Lever, near Bolton, Lancs.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

British-made KINGSHAVER dry shaver.

Disposal of Surplus

Statement on Government Plans

IN a White Paper (Cmd. 6539, Stationery Office, 1d.) published last week the Board of Trade sets forth an outline of Government policy with regard to the disposal of surplus stores after the war, although it is made clear that the proposals may be developed or modified in the light of experience and changing circumstances.

Three classes of stores are considered. The first, raw materials, are controlled by Government agencies and surpluses, including scrap, will be notified to the appropriate Department and will be allocated or disposed of in accordance with its instructions. Where the volume of Government-owned raw materials is substantial in relation to normal peacetime requirements special disposal arrangements may have to be made. Trade and other interests concerned will be consulted in connection with plans for the disposal of raw materials.

The second class—stores such as guns, ammunition, etc.—can have no direct civilian use. Some may be broken up for scrap which will be handled by the appropriate Raw Material Control and spare parts will be separately dealt with as " manufactured civilian stores "—the third class. Special consideration will be given to the disposal of surplus aircraft supplies.

A Wide Variety

The greatest problem arises in connection with manufactured civilian stores which, the White Paper says, range " from typewriters to trucks, from raincoats to road rollers." The President of the Board of Trade has already announced that there must be an orderly disposal of surplus goods which will not allow profiteering at the expense of the consumer and, on the other hand, will pay due regard to the interests of producers and distributors.

Steps are being taken to ensure that no goods are declared " surplus " if they might be required for any public purpose. At present no useful estimate can be given of the quantities involved of the various classes of goods which are being classified, nor of the time when they will be actually available. In the case of some articles the whole or part of the surplus may be allocated for the relief and rehabilitation of liberated territories.

Three general principles are to be adopted:—(*a*) To release the stocks at a rate which, while fast enough to get the goods into the hands of consumers when they are most required and to clear badly needed storage space, aims at avoiding adverse effects on production through the flooding of the market. (*b*) Unless there is good reason to the contrary, to distribute goods through those traders or manufacturers who would normally handle or use them, and to secure that ultimate consumers in all parts of the country have a fair opportunity of buying them. (*c*) To ensure, by statutory price control if necessary, that the prices charged to the ultimate consumer are fair and reasonable in relation to the current prices of similar articles to prevent profiteering and minimise the number of intermediaries.

Representatives of the industries and trades concerned will be consulted regarding the application of these principles, with due regard to the needs of consumers. Provisional disposal plans will be drawn up before the time when the goods actually become available for disposal in any quantity. While these cannot be of a precise nature it should be possible to plan in advance the general methods to be adopted for the different classes of goods, including the channels of distribution and the extent of control of margins and prices.

Proposed Traders' Organisations

It will not always be desirable to sell surplus goods by unrestricted competitive tender to the highest bidder. In some cases it may be appropriate to institute sale by negotiation with restricted tender; in others disposal may be through a non-profit-making organisation membership of which would be open to all traders normally handling the goods concrned. Discussions on these matters with representatives of trades and industries concerned have already started.

Where it is decided that some of the surplus goods should be exported arrangements will be made, where appropriate, for their sale through traders or manufacturers who normally engage in this type of business. Arrangements will be made for the reconditioning of surplus articles where appropriate. Wherever possible surplus goods will be given a distinguishing mark in order to facilitate price and distribution control.

As to the disposal machinery: for each category of goods one Department has been designated as the Disposal Department. This will usually be the Ministry of Supply but for certain classes the Ministry of Works, the Ministry of Aircraft Production, the Admiralty or the G.P.O. have been designated. Similarly for each category of goods one Department will decide methods of disposal, prices and margins and rate of release. For many articles, including almost all consumer goods, the Board of Trade will perform this function, but in a number of cases the Disposal Department itself will undertake it.

Traders or manufacturers who wish to know which Department they should approach regarding the disposal of surplus stores should get into touch with the Board of Trade, which will also deal with any general inquiries.

Sir W. Chamberlain Memorial

TO establish a permanent memorial to the late Sir William Chamberlain, Regional Transport Commissioner, North Western Region, it is proposed to create a fund, the proceeds of which would enable road transport scholarships or educational grants to be given to persons engaged or intended to be engaged in the industry in the North Western Region. A minimum of £5,000 is required, and subscriptions should be sent to the Sir William Chamberlain Memorial Fund, c/o Martins Bank Ltd., Old Trafford, Manchester, 16.

South Wales Enterprise

Expansion of Safety Lamp Company's Interests

SO closely associated has the name of the Concordia Electric Safety Lamp Co., Ltd., become with lighting equipment for mines in the fourteen years of its existence that there is a tendency to overlook three other important activities—the manufacture of transformers, electric soldering irons and devices, and tungsten and other contacts, in which the company has been engaged since just before the war broke out. The war itself, too, while increasing the importance of these new interests, has tended somewhat to distract attention from them.

A few days ago Mr. C. C. Bleach, managing director of the company, showed us something of the work now being done in these new spheres of development. Growing out of a business taken over in 1939 from Rugby Neon Signs, Ltd., the production of transformers, undertaken by the associated Concordia Transformer Co., now covers a range of units up to a maximum capacity of 50 kVA. Practically all industrial uses are catered for, but special attention is paid to apparatus for low-voltage lighting, radio, television, neon signs and electro-plating. Battery chargers are also constructed and post-war plans include the extension of the range of transformers up to 250 kVA, together probably with a return to the manufacture of small neon tubes.

Production methods follow more or less standard practice. The bobbins are cut from

Completing the assembly of small transformers

bakelite tube, the cheeks being burred on, and the winding of many of the smaller units is done, ten at a time, by means of a multiple winding machine. Impregnation is carried out in three stages. First the coils are baked in a thermostatically controlled oven at a temperature of 110–120 deg. C. for four hours and then dipped in cold varnish. They are returned to the oven and the temperature is raised gradually from 75 deg. C. to 120–130 deg. C., this process taking about fourteen hours. After redipping in sealing varnish, the coils are baked for another fourteen hours at a similar temperature. Particular care is taken to keep the specific gravity of the varnish correct in order to ensure a high degree of penetration.

The insertion of the yokes and the addition of the tags, clamp-plates and terminal boards complete the assembly, except in cases where special impregnation is required for tropical climates, etc. Colour codes are used for all leads. After a preliminary ratio test there is a final general inspection, with a flash test.

Inspecting tungsten contacts

Elco (Treforest), Ltd., the organisation responsible for making the soldering irons has studied the needs of users changing from one district to another by having all the elements for a particular loading of the same dimensions. Three sizes of elements, $\frac{1}{2}$ in., $1\frac{5}{16}$ in. and 2 in. in diameter, are available to cover loadings up to 175, 300 and 500 W, respectively. The elements are made in sections so that any length can be built up as required, a feature which, incidentally, makes them suitable not only for the irons but also for immersion heaters and furnaces.

The element spirals, which are wound from 40 or 41 SWG nickel-chrome wire (20 per cent. nickel, 80 per cent. chrome) are housed in slots running up and down ceramic formers, which are inserted in brass containers filled with magnesium powder and

the caps are pressed home. An exceptionally long life under rigorous conditions is claimed to result from this method of construction and the company has records of some units which have been in use 10 hours a day for over six months. Models for both industrial and domestic use are available, with transformers for operation at 12 V if desired. In addition to a variety of easily interchangeable bits there is a soldering pot attachment.

Soldering iron elements under test

Tungsten Contacts

The manufacture of tungsten contacts carried out by the third associated company, the London Platinum Screw Manufacturing Co., Ltd., involves a highly specialised technique. Because of its hardness and brittleness the tungsten cannot be cut or filed in the ordinary way, and grinding is the only practical method. Discs of the metal 1–2 mm. thick are therefore ground from rod of the desired diameter, by means of a wheel or disc of carborundum bonded with rubber. After microscopic inspection for faulty material followed by a micrometer checking for thickness, the discs are brazed on to bases usually of mild steel, brass or phosphor-bronze. For this process electric furnaces operating at 1,100–1,300 deg. C. with a hydrogen atmosphere are employed, the discs being placed in 6 in. by 4 in. "boats" of carbon or nickel-chrome, drilled to the appropriate size, together with the brazing medium flux and bases. After 7–8 min. treatment the boats are pushed out into a water-cooled chamber.

The contacts are then subjected to further inspection and where necessary shear tests prior to polishing with specially fine abrasive paper. As tungsten has a melting point of 3,410 deg. C., the finished products, which are in demand for magnetos, relays, teleprinters, etc., will withstand arcing much better than other metals commonly used, such as silver (960 deg. C. melting point), gold (1,063 deg. C.) and platinum (1,773 deg. C.). While the production of these tungsten products now forms the company's main business, contacts of other metals are also manufactured in large quantities.

Although we have given prominence to the work of the associated companies, it must not be thought that the activities of the parent organisation have been static in the past few years. Its range of miners' lamps and charging equipment has been constantly improved and extended, and special units have been developed for use in petroleum atmospheres and for A.R.P., police and similar purposes. An extensive electroplating department covering nickel, cadmium, tin, copper, zinc and silver not only serves the companies' own needs, but also handles a considerable amount of work for outside customers. To act as the sales organisation for all four companies with a particular view to export after the war, Elcordia, Ltd., was recently formed with an office in London.

I.M.E.A. Policy Defended

FOLLOWING a meeting of the Council of the Incorporated Municipal Electrical Association at Liverpool on July 20th the Corporation Electric Power and Lighting Committee gave a dinner at which Alderman A. Critchley, who presided, said Liverpool had a feeling that all was not well with the I.M.E.A. and that it was veering away from the foundation principle of municipal control. As a municipal association it should not temporise with proposals which would hand over municipal property to some central authority; no clearly defined public advantage could result from that.

Mr. W. P. Lilwall, president of I.M.E.A., described Alderman Critchley's view as "too gloomy." Although they believed in municipal control, many authorities had not taken the long view and had allowed private interests to step in. Now they complained they had not got everything in their own hands.

Alderman L. Hogan, J.P., said that some form of unification and nationalisation with the object of lowering the distribution charges to the lowest point, was inevitable after the war. Lower tariffs were necessary to attract new industries.

In the view of Mr. H. C. Lamb reorganisation of the electricity industry in some parts of Lancashire was much needed.

Appliance Maintenance

Women's Work at Bradford

EVEN in peacetime the repair and maintenance of domestic electrical appliances is a big business involving many difficulties. In wartime these difficulties are strongly accentuated by the lack of labour and scarcity of materials, mainly the former. This is felt particularly by some of the larger undertakings such as Bradford, which has over 80,000 appliances of various kinds on hire and hire-purchase.

Mr. T. H. Carr, the Bradford electrical engineer and manager, has sent us some illustrated details of the way in which the problem has been met by the employment of women. It was appreciated that it was asking something of women to carry out successfully work which is usually undertaken by skilled men with many years of training, but it was felt that if they were carefully chosen and the technical instruction was made progressive and interesting, good results might be possible.

Accordingly, a start was made about two and a half years ago with a few women. They were given elementary instruction in the use of small tools, and then taught how to re-wire kettle and iron connectors and plugs. Instruction in elementary technics was given each day by members of the Department's staff, and the women were encouraged to keep notebooks in which they wrote details of each lecture and made sketches and diagrams of the various pieces of apparatus with which they were concerned. From repairs to flexibles they were moved to the oven element and grill-boiler plate reconditioning bench, and here they were shown the correct method of assembling spirals on formers, and of completing the final fitting of the element in its sheath or plate.

Re-wiring and replacement of elements in hot-plates

As the experiment looked likely to be completely successful, further women were now engaged, the Department giving preference to the wives of its own employees who were either on service with H.M. Forces or had transferred to war industry, and to other women whose husbands were similarly situated. It was decided to give the majority of the women a complete training in domestic apparatus repairs and reconditioning, so that, in the event of congestion in any section, qualified workers could be transferred to meet the demands of the situation. Most of the new women were, therefore, put through the same course of training as that given to the original employees.

Assembling cookers after reconditioning

The next work undertaken was the repair of such apparatus as irons and radiators, and in this section certain of the women proved specially proficient, a selection of the more advanced of the employees being tentatively made with a view to more advanced training and instruction being given. Selected women were also put on the kettle repair bench and instructed in the use of the blow-lamp and soldering iron, and here again the instructors were surprised at the aptitude shown in the rather difficult tinning and soldering operations.

It was found about this time that certain

of the skilled men who carried out repairs to domestic apparatus on consumers' own premises were likely to be transferred to war industry, and it was decided to specially train some of the women to replace them. They were given instruction in the construction and maintenance of cookers and water heaters, and taught to drive the small vans used for carrying the spares required for outside repair work. Women are now regularly employed in this section and are dealing quite satisfactorily with a large proportion of the hundreds of domestic apparatus repair calls received each week.

Two other aspects of the work undertaken by the women may be mentioned briefly. At one period the Department experienced very serious difficulty in obtaining kettle elements. After experimental work had shown that it was possible in many cases to recondition faulty elements, a number of women were put on this work. Here again the rather intricate work of extracting the faulty element from the copper sheath, reclaiming mica from the defective parts, spiralling the new element, fitting it in the sheath, and bending the sheath into its final shape, are being carried out successfully by the women.

The second new operation now being undertaken by women is the reconditioning of faulty hot-plates. This has been found both practicable and economical, and women are now engaged in dismantling the defective plates, extracting the damaged spirals, remoulding the refractory groove, assembling the new spirals in the plates, and re-cementing the whole plate.

The repair and reconditioning service which has been described has been of use not only to Bradford itself; the mutual aid scheme prepared by E.D.A. has enabled the facilities to be placed at the disposal of neighbouring undertakings, six of which have already taken advantage of the arrangement.

Before the war the women were engaged in a variety of tasks—housework, woollen textile manufacture, shop work, etc., but they have fitted into their new "trade" very satisfactorily, and their team work is noteworthy. The consumers' superintendent, Mr. F. H. Barnett, and members of his staff, Messrs. A. Hutchison, C. W. Chandler and W. Bennett, have shown special interest in the work, and great credit is due to them for their initiative and enterprise.

ELECTRICITY SUPPLY

Breakdown at Liverpool. Wimbledon Representation Question.

Ashton-under-Lyne.—GRID SUBSTATION.—A substation is to be erected for the Central Electricity Board.

Barrow-in-Furness.—EXTENSIONS.—The Electricity Committee is to provide a supply to Bobbin Mill, Sparkbridge; premises and farms at Montbarrow; and Mill House, Bardsea.

Denbigh.—FARM SUPPLIES.—On July 18th in the House of Commons Sir Henry Morris-Jones asked the Minister of Fuel and Power whether he was aware that not more than one in twenty farms in the county of Denbigh had an electricity supply; whether he had any scheme in view to remedy this deficiency; and when the work would be commenced.

Mr. T. Smith, who replied, said that owing to the great shortage of labour and materials the Minister regretted that extensions of electricity supply had had to be restricted. In the case of farms where the application for a supply of electricity was certified by the County War Agricultural Executive Committee as being urgently necessary, every effort was made by the local electricity undertaking concerned to give the supply. The development of electricity supplies in rural areas was an important aspect of the general problem of improvement of electricity services for the country as a whole, and was under consideration by the Government.

Falmouth.—PURCHASE OF UNDERTAKING.—The *Sunday Independent* (Plymouth) reports that the Electricity Commissioners will not at present sanction the exercise by Falmouth Council of its right to purchase the local electricity undertaking. Application is therefore to be made for a three years' extension of the period for giving notice to purchase.

Gateshead.—LOCAL AUTHORITIES' PURCHASE RIGHTS.—The Town Council has agreed to support a resolution from Ealing Borough Council that steps should be taken to prevent the introduction of any legislation which might tend to diminish possible rights of future purchase of electricity concerns which are vested in local authorities at the present time.

Hull.—DEPARTMENT'S FINANCES.—When Mr. D. Bellamy, general manager of the Electricity Department, had submitted his report for 1943-44 showing a net profit of £37,241 the Electricity Committee passed a resolution expressing appreciation of the excellent results attained.

Liverpool.—SUPPLY FAILURE.—There was a serious breakdown in the electrical services of Liverpool on July 18th, arising from a mishap which caused a fire at the Clarence Dock station. In a statement on the cause of the breakdown Mr. J. Eccles, city electrical engineer, says that a fault occurred on the bus-bar insulator at 10.57 a.m. which necessitated the isolation of the bus-bars, and thus loss of output from Clarence Dock. Lister Drive power station was operating in parallel with Clarence Dock and the plant there became so seriously overloaded that it was decided to trip it out by hand. As a consequence of the fault at Clarence Dock

an oil-immersed reactor in the neutral circuit of one 50-MW set became seriously overheated, and the oil ignited. This fire was under control by 11.45 a.m. Work proceeded with the restoration of supply, and a partial service was available from Lister Drive at 12.15 p.m., a further supply from Lister Drive at 1 p.m., the first machine at Clarence Dock was turning round by 2 p.m., a substantial supply from the grid was available at 2.29 p.m., and full supplies were restored everywhere by 4.15 p.m.

North Middlesex.—FUTURE OF UNDERTAKINGS.—It is reported that the local authorities at Enfield, Southgate, Tottenham and Wood Green are to be asked whether they are in favour of the acquisition of electricity undertakings in the North Middlesex area by the London and Home Counties Joint Electricity Authority. Edmonton Council has already expressed itself in favour of this policy.

Pitlochry.—"THREAT TO AMENITIES."—At a meeting held in the public hall a resolution was carried unanimously that the Tummel-Garry hydro-electric scheme would inflict serious losses on the community, and a committee was formed to defend the interests involved. The speakers included the Duchess of Atholl, Mr. W. M'Nair Snadden, M.P., Capt. W. T. Shaw, M.P., and Mr. Buckham W. Liddell, W.S. Mr. Liddell said that water was to be taken from the Bruar stream and other sources northward which flowed into the River Garry, and conveyed by tunnel or aqueduct to Glen Errochty and thence by tunnel into Loch Tummel. The loch would be raised by about 17 ft. and doubled in length. Opposite Pitlochry the River Tummel was to be dammed by the construction of a 65-ft. wall, and only 2½ ft. of water would be left at the Falls of Tummel. The recreation ground, Cluny Bridge, favourite river walks and a public road would be submerged. The scheme embraced three generating stations, one below the dam, another below the Falls of Tummel and the third in Strathtummel. The amenities of Pitlochry, he said, would be gravely threatened.

Scotland. — FINANCING HYDRO-ELECTRIC SCHEME.—In the House of Commons on July 18th, Captain Shaw asked the Secretary of State for Scotland if he had given authority, or proposed to give authority, to the North of Scotland Hydro-Electric Board to raise money to finance its first constructional scheme.

Mr. Johnston said that public notice was given on June 30th that the Board's first constructional scheme, covering projects at Loch Sloy, Loch Morar, and near Kyle of Lochalsh, had been approved by the Electricity Commissioners, and that any objections to the scheme might be submitted to the Secretary of State during a period of 40 days ending August 11th. The scheme would then be considered together with any objections received, and if it was confirmed, with or without amendment, it must lie before Parliament for another period of 40 days before it could come into effect. No application for consent to the raising of the capital required for the scheme had meanwhile been submitted.

Scarborough.—SUPPLY TO FILEY.—The Electricity Committee is seeking sanction to provide a supply to premises in Muston Road, Filey, within the area of the Buckrose Light & Power Co., Ltd.

South Wales.—CONFERENCE ON REORGANISATION.—The South Wales and Monmouthshire Bulk Supply Association has called a conference at Cardiff to discuss a resolution to the effect that the only equitable form of reorganisation for the electricity supply industry must be based on the continuance and extension of public ownership and recommending the Ministry of Fuel and Power to prepare a basis of reorganisation to provide for the amalgamation of local authority undertakings into joint boards and that the company undertakings should be incorporated into such joint boards to be controlled by representatives of the local authorities in whose area the boards will operate.

Wimbledon.—REPRESENTATION ON ELECTRICITY COMMITTEE.—The Wimbledon Electricity Committee is to reconsider a request from the Malden and Coombe and Merton and Morden Councils for representation on the Committee and is to receive a deputation from the two authorities. When the matter came before the Town Council last January, following a request from the Malden and Coombe Council, the Committee recommended that a reply should be sent saying that the Council was unable to see its way to accede to the suggestion, but would welcome any representations made from time to time regarding electricity supply matters in Malden. At the Council meeting, when it was stated that a similar request had since been received from Merton and Morden, an amendment in favour of the reference back of the Committee's recommendation on the grounds that Wimbledon would lose nothing and might gain much from such co-operation was defeated by thirteen votes to eleven.

York.—MODEL HOUSE.—The equipment of a proposed model Council house includes an electric cooker, refrigerator and water-heater. In addition an electric washboiler is to be fitted in a wash-house adjoining the kitchen.

Overseas

Eire.—RESTRICTIONS RELAXED.—The Electricity Supply Board has announced a general relaxation, as from July 17th, of the drastic restrictions on the use of electricity. Consumers of electricity for motive power and industrial process heating whose "ration" was recently increased from 75 to 85 per cent. of their consumption in the corresponding period of 1943, are now allowed to use up to 100 per cent. Increased supplies for both cooking and lighting are also conceded. The ration of 50 per cent. of the 1941 consumption is now raised to 75 per cent., while supplies for lighting and general domestic purposes are increased from 20 to 40 per cent. of the 1941 amount. The absolute prohibition of the use of space heating (*e.g.*, electric fires, heaters, radiators, tubular heaters, etc.) is maintained and so is the prohibition of the electric heating of water in cylinders for hot water supply, and the use of electricity for traction. While thus providing more light and power, the Electricity Supply Board says that there is an urgent and continued necessity for the utmost economy and repeats its warning that the penalty for failure to comply with the restrictions is disconnection of the supply. This is no vain threat, for Press reports describe a large Dublin restaurant where customers eat by candle-light and in the kitchen "ghostly figures of the staff grope in the gloom."

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

The Electric Construction Co., Ltd., whose accounts were reviewed in our issue of June 30th, held its annual meeting on July 20th. Mr. G. W. Spencer Hawes, O.B.E. (chairman) said that all the company's previous achievements had been surpassed during the past year. At the last meeting he had referred to the necessity of providing for the overhauling and renewal of plant; by allocating £4,600 from the profits they had raised this provision to £29,600, and the allowance for depreciation had been increased to £20,000. The general reserve now stood at £230,000.

The report was adopted and at a subsequent extraordinary meeting resolutions were adopted for converting the preference and ordinary shares into stock.

Pye, Ltd., held its annual meeting on July 21st, when the chairman (Sir Thomas Polson) said that the company had continued to enjoy "unique" prosperity despite difficult conditions. Referring to forecasts regarding the future of the radio industry, Sir Thomas said that they shrank from seeing their name coupled with some of the other companies which had been mentioned. He warned investors that, although the radio industry had a great future, many difficulties would have to be overcome before it could be regarded as definitely stabilised. They were against any but necessary control after the war and equally they were opposed to any system which meant a price cartel or artificial protection of the market.

There was need for an intelligent and progressive point of view in dealing with surplus Government materials lest the legitimate industry became a victim of unfair conditions. The Government should help to remove obstacles to export trade; for instance, the strengthening and improvement of the organisation of our consulates was urgently required. While many radio devices invaluable in war had been produced, many would be of little, if any, use in peacetime. He concluded by expressing his confidence in the future of the industry.

The Anglo-Portuguese Telephone Co., Ltd., which is controlled through the Telephone and General Trust by the Automatic Telephone & Electric Co., records a net profit for 1943 of £52,126 (against £52,267). A final dividend of 5 per cent., again making 8 per cent. is to be paid on the ordinary stock and an 8 per cent. (same) dividend on the "A" ordinary shares, leaving £39,237 (£39,086) to be carried forward.

In a statement circulated with the report Sir Alexander Roger, chairman and joint managing director, said that the company had only managed to meet the more urgent priority demands and this solely by ingenious improvisations and readjustment. The number of stations in service at the end of 1943 was 63,176. The Azores Agreement between the British and Portuguese Governments last October was of the widest importance to both countries. The company's programme involved the expenditure of at least a million pounds on the telephone service in the immediate post-war years. All Portugal's vast colonial empire was now and would be still more interested in intercommunication by radio, telephone, telegraph, air, roads and railways, and there was ample room for collaboration between Portugal and Britain.

H. J. Baldwin & Co., Ltd., report a profit for the year ended March 31st last of £22,136, as against £33,873 for the preceding twelve months. Taxation takes £5,680 (£17,651), but the sum available is increased by the addition of £56,374 (nil) from profit on sale of assets. The general reserve receives £46,374 (nil) and the contingencies reserve £10,000 (nil). The ordinary dividend is maintained at 10 per cent. and £16,695 (£13,239) is carried forward. Profits from subsidiaries, none of which has been included in the accounts, amount to £8,095, subject to taxation.

Hick, Hargreaves & Co., Ltd., report a net profit for 1943-44 (after providing for taxation, depreciation, etc.) of £40,169 (against £47,430 for 1942-43.) Contingency reserve receives £10,000 and £5,000 is set aside for the foundation of a benevolent and welfare fund for the employees. The year's dividend is again 10 per cent. and £4,077 (against £5,308) is carried forward.

Ultra Electric Holdings, Ltd., states that the dividend received from the manufacturing company (Ultra Electric, Ltd.) amounts to £12,000 free of tax and a distribution of 10 per cent. is again being made. The manufacturing company's profit for the eleven months to March 31st last, after meeting taxation, was £25,988 (against £43,067 for the previous year).

The Electrical Switchgear & Associated Manufacturers, Ltd., report that after taxation the net profit for the year ended March 31st last amounted to £16,820, as compared with £5,963 for the previous five months. A dividend of 20 per cent. is to be paid (against 5 per cent. for five months) and £15,182 (£14,987) is carried forward.

Greenwood & Batley, Ltd., are to pay a final dividend of 10 per cent., again making 15 per cent. for the year. After making provision for E.P.T., the gross trading profit, together with interest and income from investments, etc., amounted to £155,105 for the year ended March 31st last, which compares with £152,167 for the previous year.

Radiovisor Parent, Ltd., records a profit of £2,466 for the year ended March 31st last, as compared with a loss of £1,569 in the previous year. This reduces the debit balance from £36,650 to £34,184.

Crossley Bros., Ltd., are repeating the deferred ordinary dividend of 5 per cent. from a net profit for 1943-44 of £35,090 (against £33,933.)

The Yorkshire Electric Power Co. is again to pay an interim dividend of 3 per cent.

Electrical Distribution of Yorkshire, Ltd., is maintaining its interim dividend at 4½ per cent.

Mather & Platt, Ltd., are to pay an interim dividend of 4 per cent. (same).

Waygood-Otis, Ltd., are maintaining their interim dividend at 10 per cent.

Hoover, Ltd., has again declared an interim dividend of 3¼ per cent.

New Companies

Norman Carter Co., Ltd.—Private company. Registered July 15th. Capital, £1,000. Objects: To carry on the business of electrical, wireless and general engineers, etc. Directors: N. E. W. Carter, Meadowside, Badgeworth Lane, near Cheltenham, and W. H. Hines, 4, Orrisdale Terrace, Cheltenham. Registered office: 30, Winchcomb Street, Cheltenham.

Electrokits, Ltd.—Private company. Registered July 15th. Capital, £5,000. Objects: To carry on the business of electricians, radio and electrical engineers, etc. Directors: L. J. Turner and G. M. Turner, both of Radley Lodge, Inner Park Road, Wimbledon, and D. L. G. Hughes, 116, Rivermead Court, S.W.6. Registered office: 39, Church Road, Hove, Sussex.

Coil Winders, Ltd.—Private company. Registered July 14th. Capital, £100. Objects: To carry on the business of electrical equipment specialists, etc. Directors: W. E. Cameron, 16, Lytton Grove, Kempston, Beds, and Jessie R. Ball, 86, Salisbury Street, Bedford. Registered office: 16, Lytton Grove, Kempston, Beds.

H. J. Briggs, Ltd.—Private company. Registered July 8th. Capital, £2,000. Objects: To carry on the business of electricians, engineers, manufacturers of, and dealers in, stoves, cookers, etc. Directors: H. J. Briggs, 65, College Gardens, Chingford, E.4, and E. C. Hardcastle, 49, Byron Avenue, E.18. Registered office: 65, College Gardens, Chingford, E.4.

C. A. Hughes Blattman, Ltd.—Private company. Registered June 30th. Capital, £5,000. Objects: To carry on the business of electrical and mechanical engineers, etc. Directors: C. A. Hughes Blattman, 33, Ormond Avenue, Hampton, Middlesex; and A. Gee, 18, Farm Court, Hendon, N.W.4. Registered office: Midland Bank Chambers, 1, York Street, Twickenham.

C. S. S. Electrical Co., Ltd.—Private company. Registered July 11th. Capital, £500. Objects: To carry on the business of mechanical, motor, electrical and general engineers, etc. First directors: L. J. Clark, 107, Collinwood Gardens, Ilford, and E. W. Clark.

Companies' Returns

Statements of Capital

Evered & Co., Ltd.—Capital, £300,000 in 150,000 preference and 150,000 ordinary shares of £1. Return dated March 13th. 125,000 preference and 125,000 ordinary shares taken up. £106,393 paid on 100,000 preference and 6,393 ordinary shares. £143,607 considered as paid on 25,000 preference and 118,607 ordinary shares. Mortgages and charges: Nil.

London Electrical Co. (Blackfriars), Ltd.—Capital, £27,500 in 27,500 ordinary shares of £1 each. Return dated April 5th. 24,542 shares taken up. £24,542 paid. Mortgages and charges: Nil. Capital increased to £32,500 in £1 shares (all ordinary) on April 12th, 1944. Return of allotments made up to May 24th, 1944, shows a further 5,290 shares allotted for cash.

Celestion, Ltd.—Capital, £123,100 in £1 shares (37,500 preference and 85,600 ordinary). Return dated January 13th (filed April 5th). 35,721 preference and 25,651 ordinary shares taken up. £51,408 paid. £9,964 considered as paid. Mortgages and charges: £79,834.

Direct Spanish Telegraph Co., Ltd.—Capital, £95,000 in £5 shares (13,000 ordinary and 6,000 preference). Return dated April 11th. 12,931 ordinary and 6,000 preference shares taken up. £94,655 paid. Mortgages and charges: Nil.

Holt Electric Supplies Co., Ltd.—Capital, £2,000 in £1 shares. Return dated June 22nd, 1943 (filed June 21st, 1944). All shares taken up. £207 paid. £1,793 considered as paid. Mortgages and charges: Nil.

T. G. Brunskill, Ltd.—Capital, £1,000 in £1 shares. Return dated June 27th. 701 shares taken up. £701 paid. Mortgages and charges: £250.

George Hill & Co., Ltd.—Capital, £4,000 in £1 shares. Return dated April 19th. 2,150 shares taken up. £2,150 considered as paid. Mortgages and charges: Nil.

Overhead, Ltd.—Capital, £10,000 in 9,500 preference shares of £1 each and 10,000 deferred shares of 1s. each. Return dated March 31st (filed April 4th). All shares taken up. £10,000 paid. Mortgages and charges: Nil.

Mersey Cable Works, Ltd.—Capital, £70,000 in £1 shares. Return dated February 7th. All shares taken up. £62,400 paid. £7,600 considered as paid. Mortgages and charges: Nil.

Liquidations

Trippe Lights, Ltd.—Particulars of claims to be sent to the liquidator, Mr. P. Lockwood, 8, Ward's End, Halifax, by August 17th. (This notice is formal, as all creditors have been, or will be, paid in full.)

Millicent Manufacturing Co. Ltd., electric torch batteries manufacturers, London Lane, Hackney.—The first meetings of creditors and contributors under the compulsory liquidation of the company were held on July 21st, at Columbia House, Aldwych, W.C. A resolution was passed for Mr. C. L. Walker to wind up the company as liquidator.

Bankruptcies

A. C. Cooper, electrical engineer, carrying on business at 1a, Sherwood Street, Scarborough, Yorkshire.—This debtor applied for his discharge recently at the Court House, Castle Road, Scarborough. The discharge was granted subject to a suspension of one month.

E. Cookson, 14, Cambridge Road, Blackpool, carrying on business at the Express Magneto Repair Works, Elizabeth Street and Charles Street, Blackpool, as an automobile, electrical and mechanical engineer and trading under the firm name of N. Turnbull & Co.—Discharge granted forthwith on June 21st, subject to debtor consenting to judgment being entered against him for £5. (This sum has been paid to the Official Receiver.)

STOCKS AND SHARES

TUESDAY EVENING.

THE flying bomb is responsible for a certain amount of interruption of Stock Exchange business. As is now generally known, the House is closed during the period of a warning, and reopened when " all clear " is sounded. The effect has been to check activity and to impose a rather irritating handicap upon freedom of dealing. The telephone is an indispensable adjunct, but by no means an entirely satisfactory substitute for the normal intercourse of Stock Exchange members throughout the various markets. However, Stock Exchange brokers find that their clients are understanding and sympathetic, with the result that, within the limitations caused by the mechanical interruptions, a fair amount of trade goes on; as much, probably, as the Stock Exchange expects to see at this time of year.

Home Rails

The interim dividend announcements from the Home Railway companies will be announced this week. They are awaited without enthusiasm. Some months ago, vague optimism suggested that the interim dividends might be better than those of last July. This anticipation quietly faded. The Government was asked last week whether the £129,000,000 profit it has made on the British railways has been equivalent to the E.P.T. payments of other industrial concerns. Would there be a post-war refund of 20 per cent., the Government was asked, to enable the Home Railway companies to cope with post-war replacement problems? The official answer was in the negative, and the Parliamentary Secretary to the Ministry of War Transport laconically said that the profit earned was paid into the Exchequer. No changes have taken place in the prices quoted in our list.

Further Rises

In the equipment and manufacturing sections, a fresh number of rises have occurred. In fact a jobber, looking down a set of lists in the Stock Exchange, declared that it mattered very little what you bought nowadays, because the price was certain to go up. This is taking a picturesque view of the situation, but the weekly price-lists bear witness to the unceasing pressure of investment.

Rises of $\frac{1}{16}$ each in British Insulated, Hopkinsons and Mather & Platt have lifted the prices to 5¾, 3$\frac{9}{16}$ and 55s., respectively. Tube Investments have risen, at last, to over £5, Consolidated Signals are also $\frac{1}{16}$ up. Ward & Goldstone at 28s. 9d. are 1s. 6d. higher and improvements of 6d. to 1s. have occurred in most of the popular shares. Johnson & Phillips at 77s. and Siemens at 36s. are both 1s. higher. During the past few days, a line of 7,000 Siemens 10 per cent. preference shares came to market at 43s. The bulk of the line found little difficulty in securing a home, the yield on the money, £4 13s., being attractive when compared with preference shares of companies in the same or similar industry.

General Electric

At their ex-dividend price of 97s. 6d., General Electric ordinary shares give a return of £3 11s. 9d. per cent. on the money. The full accounts show that the disposable amount for dividend purposes in respect of the year recently ended was £540,730, about £45,000 more than in 1943. The preference dividends took £126,000 of the total and the ordinary dividend required £367,358. The dividend, as announced last week, is 17½ per cent., including the bonus of 7½ per cent. The company reserves £700,000 for income tax, the same as the amount set aside for this purpose a year ago. The carry forward is raised by nearly £50,000 to £865,134. The company has announced that the whole of the resources of the G.E.C. are being devoted to the war effort. After the war, the technical advances made by the company in the applications of electricity will be available for carrying out electrification schemes of any magnitude.

Miscellaneous Matters

The outstanding feature of the week has been a further rise of 5s. in Calcutta Trams, lifting the price to 75s. As mentioned last week, estimates of the possible price of repayment range as high as £5 per share. In sympathy with this jump, Calcutta Electrics are 1s. 6d. better at 49s. 6d. Madras Electrics retain their last week's gain of 3s. 6d. and Cawnpore remain good at 38s. 9d. Cape Electric Trams spurted to 27s. Electricity supply shares hold their previous gains. London Electrics are a good spot with 1s. rise to 29s. 6d.; in fact, buyers who were prepared to to pay 30s. 6d. found themselves unable to get on. Northamptons, in the Provincial group, strengthened to 49s. 6d. No changes worth mentioning have occurred in the cable and telephone lists. Gilt-edged stocks keep steady; a rise to 101 in Central Electricity 3¼ per cent. stock 1974–1994 is the only quotable change in these issues.

Radio

E.M.I. shares have risen to 35s., following upon their improvement of last week. There seems to be a scarcity of supply, despite the speculative character of the market, which would make in the ordinary way for flexibility in dealing. E. K. Cole are a good spot, adding a further 2s. 3d. to their last week's rise of 1s. Pye deferred at 32s. 6d. ex dividend

(*Continued on page* 140)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend: Previous	Dividend: Last	Middle Price July 25	Rise or Fall	Yield p.c.
Home Electricity Companies					£ s. d.
Bournemouth and Poole	12½	12½	61/–	..	4 2 0
British Power and Light	7	7	33/–	..	4 4 10
City of London	7	5½	29/6	..	3 14 7
Clyde Valley	8	8	41/6	..	3 17 0
County of London	8	8	42/–	..	3 16 0
Edmundsons: 7% Pref.	7	7	34/6	..	4 1 4
Ord.	6	6	30/6	..	3 18 8
Elec.Dis.Yorkshire	9	9	45/6	..	3 19 6
Elec. Fin. and Securities	12½	13½	58/6	..	4 12 4
Elec. Supply Corporation	10	10	47/–	..	4 5 0
Isle of Thanet	Nil	Nil	18/–	..	—
Lancs. Light and Power	7½	7½	36/–	..	4 3 4
Llanelly Elec.	6	6	26/–	..	4 12 4
Lond.Assoc.Electric	3	4	25/6	..	3 2 9
London Electric	6	6	29/6	+1/–	4 1 3
LondonPowerRed. Deb.	5	5	104½	..	4 14 7
Metropolitan E.S.	8	8	41/6	..	3 17 0
Midland Counties	8	8	41/–	..	3 18 0
Mid. Elec. Power	9	9	44/–	..	4 1 9
Newcastle Elec...	7	7	31/–	..	4 10 4
North Eastern Elec.: Ordinary	7	7	35/–	..	4 0 0
7% Pref.	7	7	35/–	..	4 0 0
Northampton	10	10	49/6	+6d.	4 0 6
Notting Hill 6% Pref. (£10)	6	Nil	11	..	—
Northmet Power: Ordinary	7	7	39/6	..	3 11 0
6% Pref.	6	6	30/6	..	3 18 8
Richmond Elec.	6	6	25/6	..	4 14 1
Scottish Power	8	8	41/–	..	3 8 0
Southern Areas	5	5	23/–	..	4 7 0
South London	7	7	28/–	..	5 0 0
West Devon	5	5	23/6	..	4 5 1
West Glos.	4½	3½	24/6	..	2 17 4
Yorkshire Elec...	8	8	43/–	..	3 14 5
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	7/6	–3d.	—
Calcutta Elec.	6*	6*	49/6	+1/6	2 8 6
Cawnpore Elec...	10	7	38/9	..	3 12 1
East African Power	7	7	34/–	..	4 2 4
Jerusalem Elec...	7	5	29/6	..	3 8 0
Kalgoorlie (10/–)	5	5	10/6	..	4 15 3
Madras Elec.	4*	Nil	33/6	..	—
Montreal Power	1½	1½	23	..	6 7 8
PalestineElec."A"	4*	5*	41/6	..	2 8 2
Perak Hydro-elec.	6	7	13/–	..	—
ShawiniganPower	83cts.	90cts.	16	+½	—
Tokyo Elec. 6%	6	6	22	..	—
VictoriaFallsPower	15	15	4½	..	3 12 7
WhitehallInv.Pref.	—	6	24/6	..	4 18 0

Company	Dividend: Previous	Dividend: Last	Middle Price July 25	Rise or Fall	Yield p.c.
Public Boards					£ s. d.
Central Electricity: 1955–60 (Civil Defence)	3	3	100	..	3 0 0
1955–75	5	5	115	..	4 7 0
1951–73	4½	4½	107	..	4 4 1
1963–93	3½	3½	103½	..	3 7 8
1974–94	3½	3½	101	+1	3 4 4
London Elec. Trans. Ltd.	2½	2½	97½	..	2 11 3
London & Home Counties1955–75	4½	4½	111	..	4 1 1
Lond.Pass.Trans.: A	4½	4½	121½	..	3 14 1
B	5	5	121½	..	4 2 4
C	3	3½	72	..	4 10 3
WestMidlandsJ.E.A. 1948–68	5	5	108½	..	4 12 4
Telegraph and Telephone					
Anglo-Am. Tel.: Pref.	6	6	120½	..	4 19 7
Def.	1½	1½	30	..	5 0 0
Anglo-Portuguese	8	8	27/–	..	3 18 6
Cable & Wireless: 5½% Pref.	5½	5½	114½	..	4 16 1
Ord.	4	4	79½	..	5 0 8
CanadianMarconi$1	Nil	4cts.	10/6	..	—
Globe Tel. & Tel.: Ord.	8½*	5*	40/–	..	2 10 0
Pref.	6	6	30/–	..	4 0 0
GreatNorthernTel. (£10)	Nil	Nil	24½	..	—
Inter. Tel. & Tel.	Nil	Nil	22½	..	—
Marconi-Marine	7½	7½	35/–	..	4 5 7
Oriental Tel. Ord.	16	10	49/–	..	—
Telephone Props.	6	Nil	18/–	..	—
Tele.Rentals (5/–)	10	10	12/–	..	4 3 4
Traction and Transport					
Anglo-Arg. Trans.: First Pref. (£5)	Nil	Nil	2/6	..	—
4% Inc.	Nil	Nil	5	..	—
Brit.Elec.Traction: Def. Ord.	45	45	1275	..	3 10 6
Pref. Ord.	8	8	180	..	4 9 0
Bristol Trams	10	10	56/6	..	3 10 10
Brazil Traction	$1	$1½	27½	+½	6 7 2
Calcutta Trams.	5½	6½	75/–	+5/–	1 14 7
Cape Elec. Trams	5	6	27/–	+1/6	4 9 0
Lancs. Transport	10	10	45/6	..	4 8 0
Mexican Light: 1st Bonds	5	5	104½	..	4 15 7
Rio 5% Bonds	5	5	105½	..	4 14 9
Southern Rly.: 5% Prefd.	5	5	78	..	6 8 2
5% Pref.	5	5	118½	..	4 4 9
T. Tilling	10	10	59/6	..	3 7 3
West Riding	10	10	45/6	..	4 10 0

(Continued on next page)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price July 25	Rise or Fall	Yield £ s. d. p.c.
Equipment and Manufacturing					
Aron.Elec.Ord. ..	10	15	61/-	..	4 18 4
Assoc. Elec. :					
Ord.	10	10	56/6	+1/-	3 10 9
Pref.	8	8	40/6	..	3 19 0
AutomaticTel.&Tel.	12½	12½	64/-	..	3 18 2
Babcock & Wilcox	11	11	55/-	+6d.	4 0 0
British Aluminium	10	10	51/-	+1/-	3 18 5
British Insul. Ord.	20	20	5¾	+¼	3 9 7
British Thermostat (5/-)	18½	18½	21/3	+3d.	4 7 0
British Vac. Cleaner (5/-)	15	30	30/-	..	5 0 0
Brush Ord. (5/-)	8	9	11/-	..	4 1 10
Burco (5/-) ..	15	17½	16/-	..	5 9 5
Callender's ..	15	20	5⅛	..	3 11 4
ChlorideElec.Storage	15	15	85/-	..	3 10 7
Cole, E. K. (5/-)	10	15	35/-xd	+2/3	2 2 10
ConsolidatedSignal	24	27½	6¾	+¼	4 3 10
Cossor, A. C. (5/-)	7½*	10*	26/6	..	1 17 6
Crabtree (10/-) ..	17½	17½	40/-	..	4 7 6
Crompton Parkinson Ord. (5/-) ..	20	22½	31/6	..	3 11 6
E.M.I. (10/-) ..	6	8	35/-	+9d.	2 5 9
Elec. Construction	10	12½	55/-	..	4 11 0
Enfield Cable Ord.	12½	12½	62/-	..	4 0 8
English Electric	10	10	53/3	..	3 15 2
Ensign Lamps (5/-)	25	15	21/3	..	3 10 8
Ericsson Tel. (5/-)	22*	20*	56/3	..	1 15 7
Ever Ready (5/-)	40	40	45/3	..	4 8 6
Falk Stadelmann	7½	7½	35/-	..	4 5 9
Ferranti Pref. ..	7	7	31/3	..	4 9 7
G.E.C. : Pref.	6½	6½	34/-	..	3 16 6
Ord.	17½	17½	97/6xd	+1/-	3 11 9
General Cable (5/-)	15	15	15/-	..	5 0 0
Greenwood&Batley	15	15	45/-	..	6 13 4
HallTelephone(10/-)	12½	12½	30/6	+6d.	4 2 0
Henley's (5/-) ..	20	20	28/-	+6d.	3 11 5
4½% Pref. ..	4½	4½	24/-	..	3 15 0
Hopkinsons ..	15	17½	71/3	+¼	4 18 4
India Rubber Pref.	5½	5½	23/6	..	4 13 9
Intl. Combustion	30	30	6¾	..	4 10 8
Johnson & Phillips	15	15	77/-	+1/-	3 18 0
LancashireDynamo	22½	22½	98/9	..	4 11 2
Laurence,Scott(5/-)	12½	12½	13/3	..	4 14 2
London Elec. Wire	7½	7½	39/-	..	3 17 0
Mather & Platt..	10	10	55/-	+¼	3 12 9
Metal Industries(B)	5	8	51/-	+6d.	3 2 9
Met.Elec.CablePref.	5½	5½	21/3	..	5 3 6
Murex	20	20	105/9	..	3 15 6
Pye Deferred (5/-)	25	25	32/6	+1/9	3 17 0
Revo (10/-) ..	17½	17½	43/-	..	4 1 4
Reyrolle ..	12½	12½	70/-	..	3 11 5
Siemens Ord. ..	7½	7½	36/-	+1/-	4 3 4
Strand Elec. (5/-)	7½	10	8/-	..	6 5 0
Switchgear & Cowans (5/-) ..	20	20	19/-	+6d.	5 5 1
T.C.C. (10/-) ..	5	7½	22/6	..	3 6 8
T.C. & M. ..	10	10	54/6	..	3 13 6
TelephoneMfg.(5/-)	9	9	11/9	..	3 16 8
Thorn Elec. (5/-)	20	20	26/-	..	3 17 0
Tube Investments	20	20	101/-	+1/-	3 19 4
Vactric (5/-) ..	Nil	Nil	17/-	..	—
Veritys (5/-) ..	7½	7½	8/3	..	4 11 0
WalsallConduits(4/-)	55	55	49/6	..	4 9 0
Ward & Goldstone (5/-)	20	20	28/9	+1/6	3 13 6
WestinghouseBrake	12½	14	75/-	..	3 14 9
West, Allen (5/-)	7½	7½	8/9	+1/-	4 15 9

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from page* 138)

have gained about 1s. 9d. Cossor held to their last week's 26s. 6d. Ultra Electric, now ex dividend, have gone back a trifle to 9s. 3d.

South Wales Power

One of the subsidiaries of Edmundsons Electricity Corporation is the South Wales Electric Power Company which, in its turn, controls the South Wales Power Station Company. The last-named made an issue the other day of £750,000 in 3¼ per cent. first mortgage debenture stock 1955–1968. The security is gilt-edged, the interest and sinking funds being covered by payments from the Central Electricity Board. The stock was placed privately at 100 and a cumulative sinking fund calculated to redeem the whole amount by September, 1968, is in operation.

Allen West

Allen West have paid an annual dividend of 7½ per cent. on their 5s. ordinary shares for some years past. There has always been a market in the shares, though until lately a somewhat limited one. Inquiry recently arose for the shares, and the price has gone up 1s. to 8s. 9d., attention being directed to the company by reason of the useful yield which the shares afforded at their previous figure. The yield on the money at 8s. 9d. is £4 5s. 9d. per cent. The dividend is paid once a year, in April. At the moment, there are about 5,000 shares on offer at the price mentioned. Of the £700,000 authorised capital, in 5s. ordinary shares, £487,500 is issued. There is £198,308 first mortgage debenture stock outstanding.

The Tilling Twins

Tilling Motor Services was formed in order to acquire half of the undertaking of Tilling and British Automobile Traction. The other half of the Tilling and B.A. Traction undertaking is the B.E.T. Omnibus Services Ltd. Tilling Motor Services has declared a dividend of 7½ per cent. tax free. The 10s. shares stand at 37s. 6d., giving a yield of 2 per cent. free of tax. B.E.T. Omnibus Services 10s. ordinary are quoted at 36s. 6d. The company paid a tax-free dividend for the year ended June 30th last of 6½ per cent., affording at the present price a return of 35s. 6d. per cent. tax free. In both companies there is an issue of 10 per cent. preference shares of 10s. each. These are both quoted at 25s. 6d.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

H. ALLEN and B. Wolrajch and L. Kosky (trading as Angel Glass Works).—" Electric welding devices." 13214. September 18th, 1942. (562474.)

Appleby-Frodingham Steel Co., Ltd., and L. Reeve.—" Magnetic means for the detection of the quality of steel." 18464. December 29th, 1942. (562563.)

R. Bain.—" Electrical connections." 1728. February 2nd, 1943. (562496.)

British Insulated Cables, Ltd., and J. K. Glover.—" Apparatus for controlling the production of inert atmospheres." 17523. December 9th, 1942. Addition to 520450. (562558.)

British Thomson-Houston Co., Ltd.—" Electric capacitors." 4775/43. March 31st, 1942. (562531.)

British Thomson-Houston Co., Ltd., and C. W. Wood.—" Electric lampholders of the Edison screw-type." 18232. December 23rd, 1942. (562562.)

British Thomson-Houston Co., Ltd., T. H. Woodfield and G. J. Ralph.—" Circular saws." 14606. October 19th, 1942. (562476.)

E. K. Cole, Ltd. and A. R. Knipe.—" Variable inductance coils." 4830. March 25th, 1943. (562533.)

County of London Electric Supply Co., Ltd., and H. J. F. Goodchild.—" Apparatus for laying cables and the like below ground level." 18533. December 30th, 1942. (562564.) " Apparatus for laying cables and the like below ground level." 21860/43. December 30th, 1942. (Divided out of 562564.) (562574.)

Equipment & Engineering Co., Ltd., and G. B. Young.—" Apparatus for magnetic crack detection." 4681. March 23rd, 1943. (562530.)

H. Gent and R. H. H. Pryde.—" Electrical junction systems." 15189/42. April 15th, 1942. (562580.)

W. S. Glover.—" Electric lamps." 733. January 14th, 1943. (562626.)

Heenan & Froude, Ltd., and G. H. Walker.—" Means for controlling the speed of eddy current clutches." 18479. December 30th, 1942. (562509.)

S. I. Hitchcock.—" Permanent magnets." 6642/42. May 14th, 1943. (562472.)

W. Holmes and T. Fletcher.—" Domestic washing machines." 12899. September 14th, 1942. (562547.)

Johnson Laboratories, Inc.—" Multi-range high-frequency systems." 18538/42. January 5th, 1942. (562512.)

Landis & Gyr. Soc. Anon.—" Clamping screw for electric terminals." 13429/42. October 14th, 1941. (562548.)

H. J. Lorant and J. W. Bridgland.—" Electric soldering, brazing and like tools." 120. January 4th, 1943. (562602.)

Marconi's Wireless Telegraph Co., Ltd.—" Electric amplifier and like circuits." 18398/42. December 27th, 1941. (562482.) " Apparatus for controlling the frequency of oscillators." 18570/42. December 31st, 1941. (562513.) " Receivers for receiving modulated carrier waves." 16754/42. November 25th, 1941. (562553.)

Marconi's Wireless Telegraph Co., Ltd. (Radio Corporation of America).—" Methods of uniting parts." 4483. April 3rd, 1942. (562539.)

Modinstal Electric Co., Ltd., and E. C. Malins.—" Adjustable stands or brackets suitable for infra-red generators and other articles." 17454. December 8th, 1942. (562556.)

J. N. Morris and R. L. Kent.—" Refrigerating apparatus." 3345. March 1st, 1943. (562634.)

G. F. N. Oliver and Oliver Pell Control, Ltd.—" Electric motors." 69. January 1st, 1943. (562572.)

W. S. Percival.—" Receivers for receiving amplitude modulated carrier wave signals." 18091. December 21st, 1942. (562508.)

Philco Radio & Television Corporation.—" Method and means for reducing disturbances in transmission lines." 37/43. February 3rd, 1942. (562569.) " Mounting panel for radio valves." 12755/42. November 13th, 1941. (562577.)

Philips Lamps, Ltd. (Naamlooze Vennootschap Philips' Gloeilampenfabrieken).—" Regulating apparatus for the voltage supplied to direct-current apparatus from a source of alternating voltage." 11387. September 5th, 1941. (562638.)

A. Sadler and British General Manufacturing Co. (1941), Ltd.—" Electric couplings." 17596. December 10th, 1942. (562481.)

Schall & Son, Ltd., and B. W. Harding.—" Radiographic apparatus." 1881. February 4th, 1943. (562497.)

G. H. Scholes & Co., Ltd., G. H. Scholes and F. J. Pearce.—" Electric switches having resilient movable contacts." 2037. February 8th, 1943. (562631.)

Siemens Bros. & Co., Ltd., and C. E. Rose.—" Electric cable terminations." 741. January 14th, 1943. (562490.)

Siemens Bros. & Co., Ltd., and F. Turner.—" Electrical recording apparatus." 18569. December 31st, 1942. (562598.)

Standard Telephones & Cables, Ltd., and F. E. Taylor.—" Rotatable control knobs and the like." 18577. December 31st, 1942. (562514.)

Standard Telephones & Cables, Ltd., and W. H. D. Yule.—" Electro-magnetic relays." 18628. December 31st, 1942. (562515.)

Teletype Corporation.—" Printing telegraph apparatus." 13846/42. September 29th, 1941. (562551.)

Wallace & Tiernan Products, Inc.—" Electrode structures and cell apparatus." Cognate applications 1086/42 and 1087/42. December 28th, 1940. (562537.) " Electrical determination or control of the amount of oxidizing or reducing substance in liquids." 1088/42. December 28th, 1940. (562538.)

E. G. Williams and Imperial Chemical Industries, Ltd.—" Covering of electrical conductors with an insulating coating of a thermoplastic material." 17501. December 9th, 1942. (562557.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Cumberland.—August 14th. County Council. Installation of complete new electric lighting and power installation at the hospital block at Meadow View House, Whitehaven. Applications for plans to county architect, 4, Alfred Street North, Carlisle, not later than July 31st.

Plymouth.—August 19th. Electricity Supply Department. Boiler water control and heat recovery equipment. (See this issue.)

Stockport.—Education Committee. Electric lamps for schools. Particulars from the director of education, Town Hall.

West Midlands.—August 25th. Joint Electricity Authority. Travelling crane. (See this issue.)

Orders Placed

Australia.—NEW SOUTH WALES.—Sydney County Council Electricity Department. Accepted. Low-voltage switch and fuse panels for substations to Spec. 700 (£1,114).—British General Electric Co.

VICTORIA.—State Electricity Commission. Accepted. Spec. 43-44/44. Cable.—W. T. Henley's (£1,643); Noyes Bros. (Melbourne); Johnson & Phillips (£1,640); Enfield Cable Works (Australia) (£5,236).

COMMONWEALTH.—Department of Supply and Shipping. Accepted. Reg. 12548. Cable (£26,245).—British Insulated Cables. Reg. 11304. Electric lamps.—British General Electric Co. (£3,638); Australian General Electric (£3,639); Philips of Australia (£3,639).

Bedford.—Highways Committee. Accepted. Electric sluice valves (£453).—Glenfield & Kennedy.

Darlington.—Corporation. Accepted. Wagon lift for the electricity works (£2,700)—R. Dempster & Sons.

London.—WESTMINSTER.—Cleansing Committee. Accepted. Five electric vehicle batteries (£735).—Young Accumulator Co., Ltd.

METROPOLITAN WATER BOARD. — Works Committee. Accepted. Electrically driven compressor (£136)—Hamworthy Engineering Co.

Swansea.—Electricity Committee. Accepted. Unit type sub-station l.v. fuse-gear (£11,427)—W. Lucy & Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bangor.—Extensions to infirmary (£100,000); secretary, Caernarvonshire and Anglesey Infirmary, Upper Bangor, North Wales.

Burton-on-Trent.—New schools (£72,000); G. Moncur, borough surveyor, Town Hall.

Birmingham.—Police quarters, Thornhill Road (£3,383); city engineer.

Houses, Alum Rock estate (£16,999); C. Bryant & Son, Ltd.

Bristol.—Rebuilding houses; H. M. Webb, borough engineer, 7, College Fields, Clifton, Bristol.

Cambuslang (Lanarkshire). — Proposed remand home (£2,000); burgh surveyor.

Failsworth.—Works canteen, Regent Mill; Lancashire Cotton Association (Architects' Department), Hopwood Hall, Middleton.

Hampton Wick.—Rebuilding workshop premises, 1-3, Vicarage Road; Nightingale, Page & Bennett, Eagle Chambers, Kingston-on-Thames.

Inverness-shire.—Proposed new secondary school at Fort William; county architect, Inverness.

Lancashire.—School canteens at Tottington and Westhoughton; A. J. Nicholson, county architect, County Buildings, Fishergate Hill, Preston.

Llanfyllin.—Waterworks; Wallace A. Evans, engineer, 38, Victoria Road, Penarth, Glam.

Manchester.—Works additions, Rodney Street, W. Thorpe & Son, Ltd., builders, Chester Road, Cornbrook.

Mansfield.—Canteen kitchen at Newgate School; R. F. B. Grundy, borough surveyor, Town Hall.

Northampton.—Extensions for 100 additional beds (£100,000); secretary, General Hospital, Billing Road.

Northamptonshire.—School canteen kitchens at Wollaston and Bozeat; J. Perkins, county architect, County Hall, Northampton.

Salford.—School canteen kitchens on three sites; W. A. Walker, city engineer, Town Hall, Bexley Square, Salford 3.

Catholic School, Gerald Road and Cromwell Road, Pendleton; secretary, Catholic Board of Finance, Bishop's House, Wardley Hall, Swinton.

Sheffield.—Staff canteen, Eyre Street (£3,000); W. G. Davies, city architect, Town Hall.

Stockport.—Junior Technical School, Pendlebury Hall and grounds; W. F. Gardner, borough surveyor, Town Hall, Wellington Street.

Swansea.—Completion of section of Grammar School; E. Morgan, borough architect, The Guildhall.

Towcester.—Houses (100) for Rural District Council; Sir John Brown, architect, 83, St. Giles' Street, Northampton.

Waddesdon.—Erection of cottages, Lower Blackgrove Farm, for Bucks. War Agricultural Executive Committee; R. C. White, Brooke House, Market Square, Aylesbury.

Wigan.—Dining centres at St. Andrew's, St. Mark's, St. Joseph's, St. Cuthbert's and St. Patrick's Schools; L. Lyons, borough engineer, Municipal Buildings, Library Street.